Mac OS X Server in Depth

Session 606

Mac OS X Server in Depth

Kazu Yanagihara
Mac OS X Server Engineering

Panther Server Goals

- Administration software enhancements
- Improved multiple server manageability
- More scalable directory system
- Authentication architecture
- Improved Windows compatibility

Panther Server Goals

- Administration software enhancements
- Improved multiple server manageability
- More scalable directory system—610 Directory Services
- Authentication architecture—607 Authentication
- Improved Windows compatibility

What You'll Learn

- Server administration software features and design

What You'll Learn

- Server administration software features and design
- Detailed look at Server Assistant's new auto-setup feature

What You'll Learn

- Server administration software features and design
- Detailed look at Server Assistant's new auto-setup feature
- Panther Server's Windows compatibility features and design

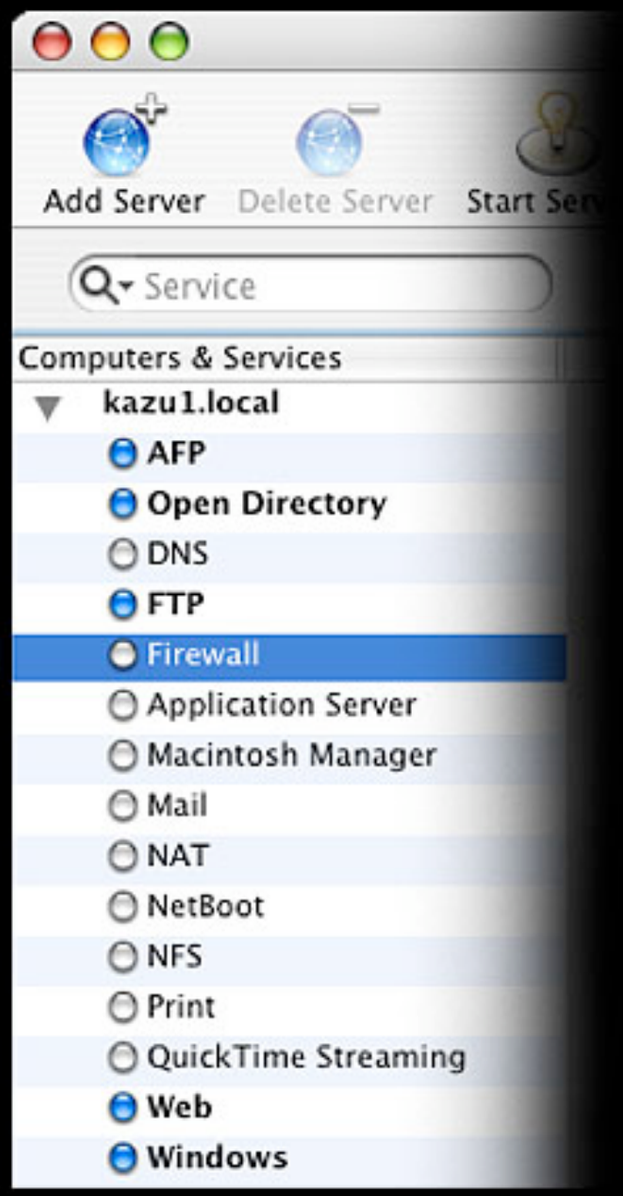
What You'll Learn

- Server administration software features and design
- Detailed look at Server Assistant's new auto-setup feature
- Panther Server's Windows compatibility features and design
- Tips on developing for Panther Server platform

Administration Software

New Server Admin

- Server Status + Server Settings = Server Admin
- New GUI
  - QTSS
  - Open Directory
  - DNS!
  - NAT
  - Application Server
- Enhanced GUI
  - Web, Mail, Firewall, ...



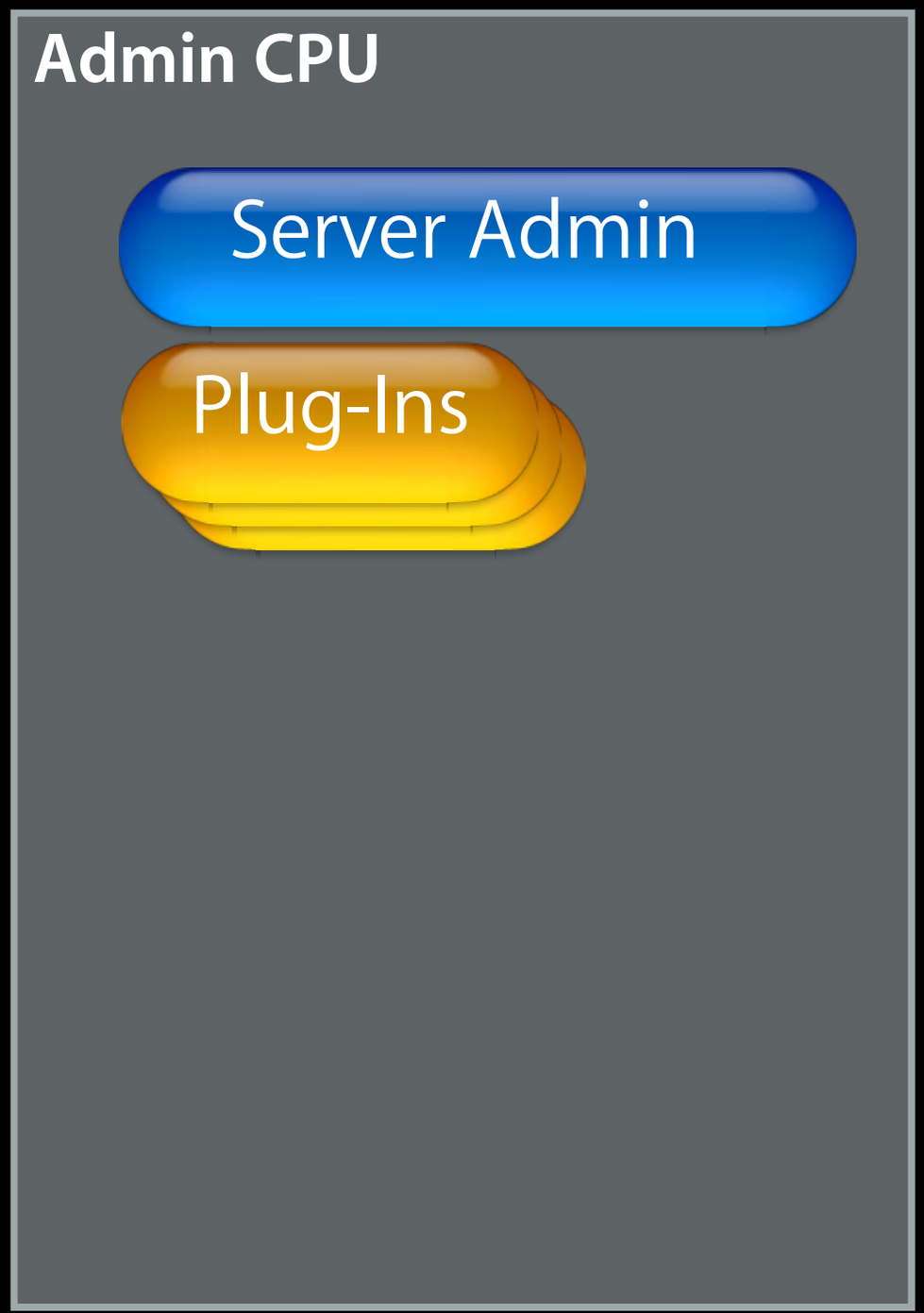
New Server Admin

- New features
  - Easy replication of service configuration
  - Remote software update
  - Read-only mode
  - Summary view
  - Other minor enhancements throughout
- Backward compatible with Jaguar Server
  - Monitoring only

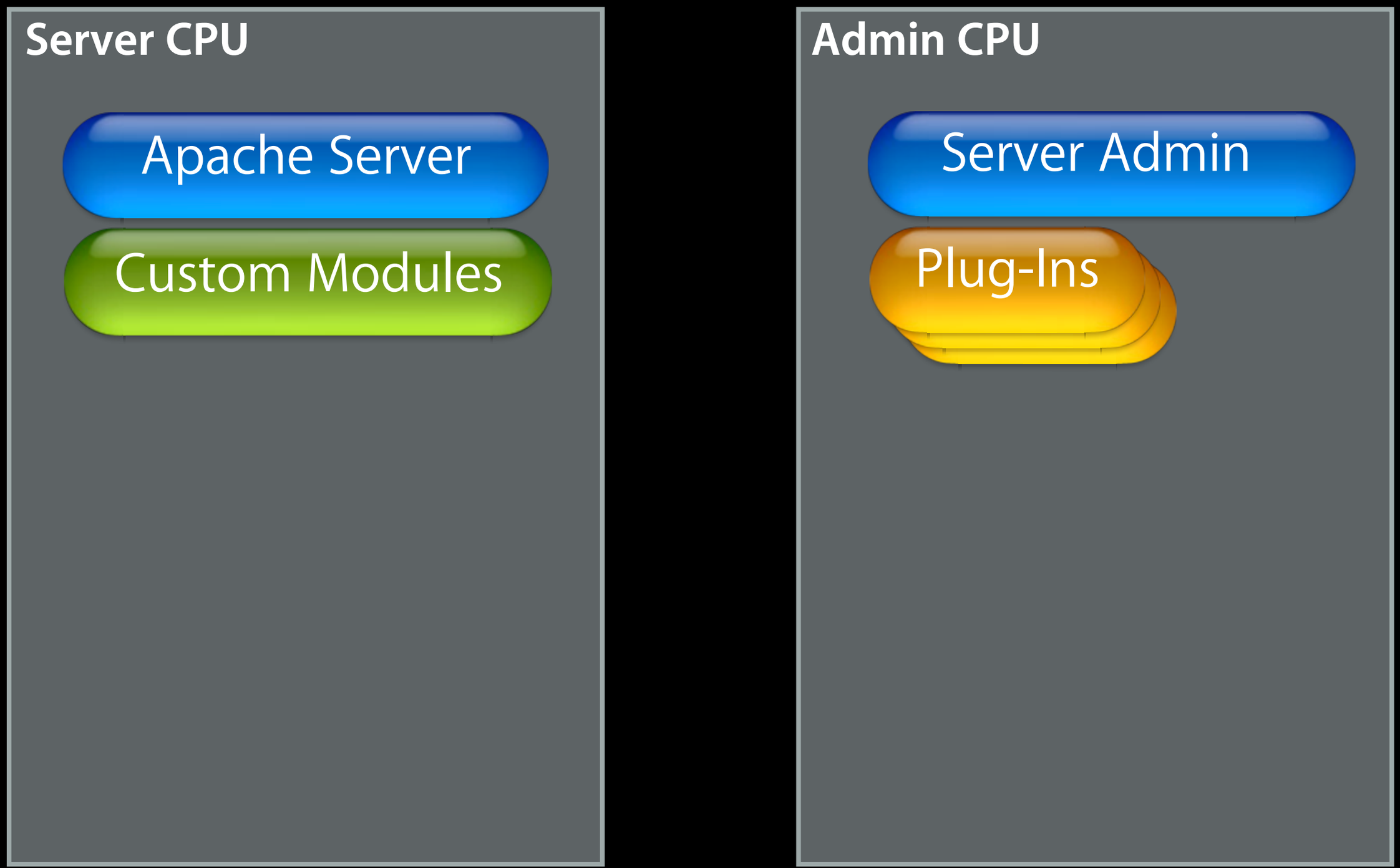
Demo

Server Admin

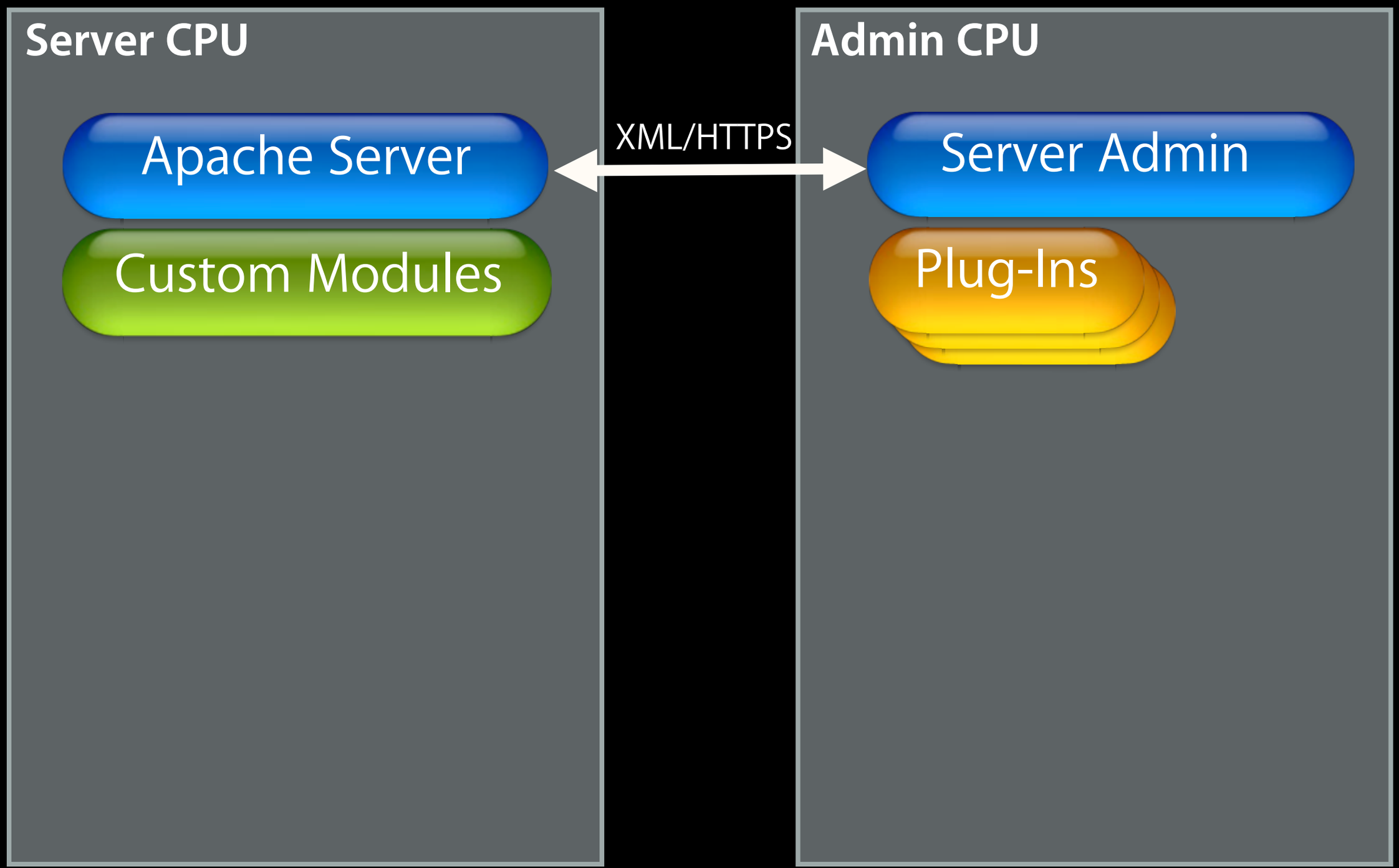
Server Admin Architecture



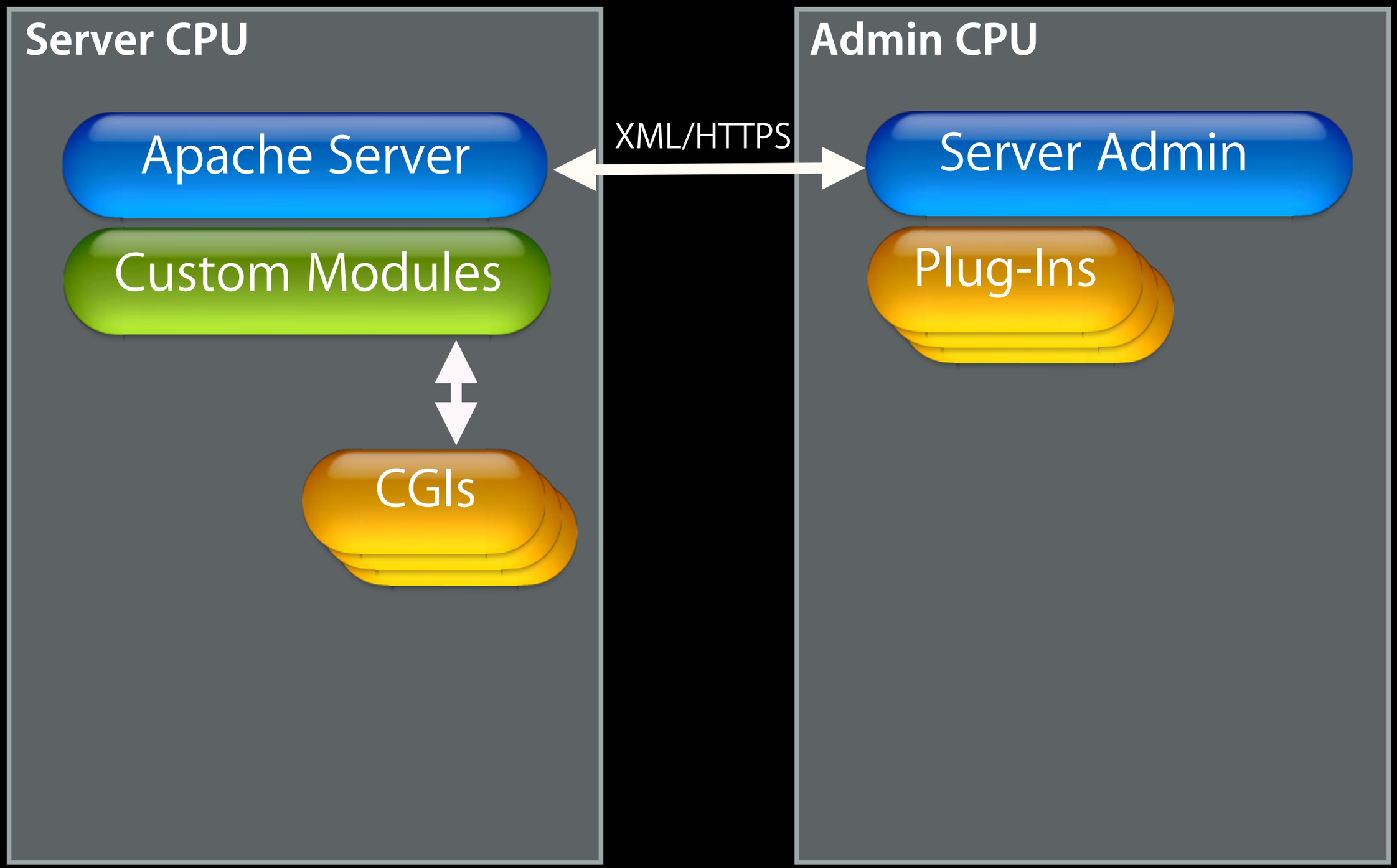
Server Admin Architecture



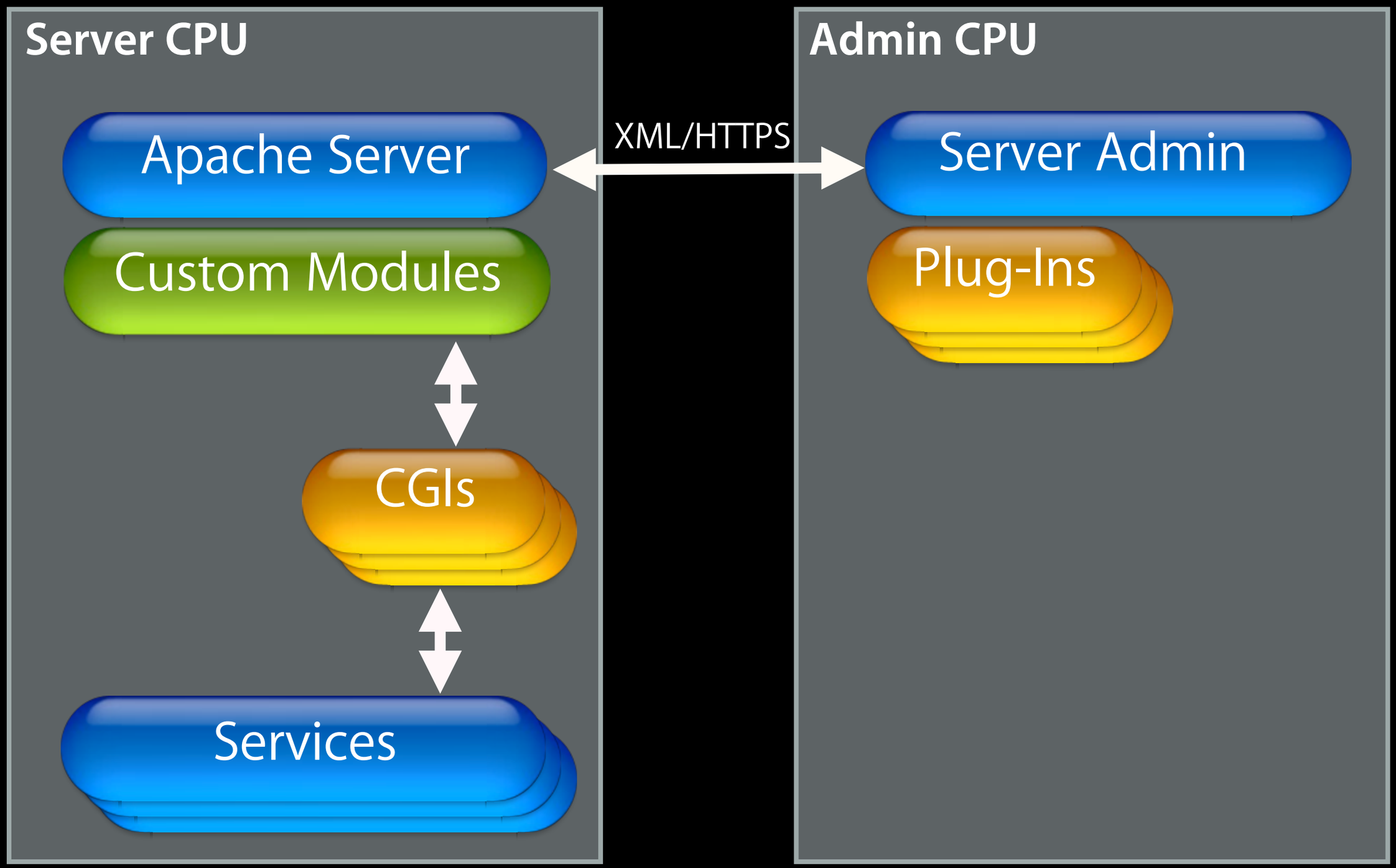
Server Admin Architecture



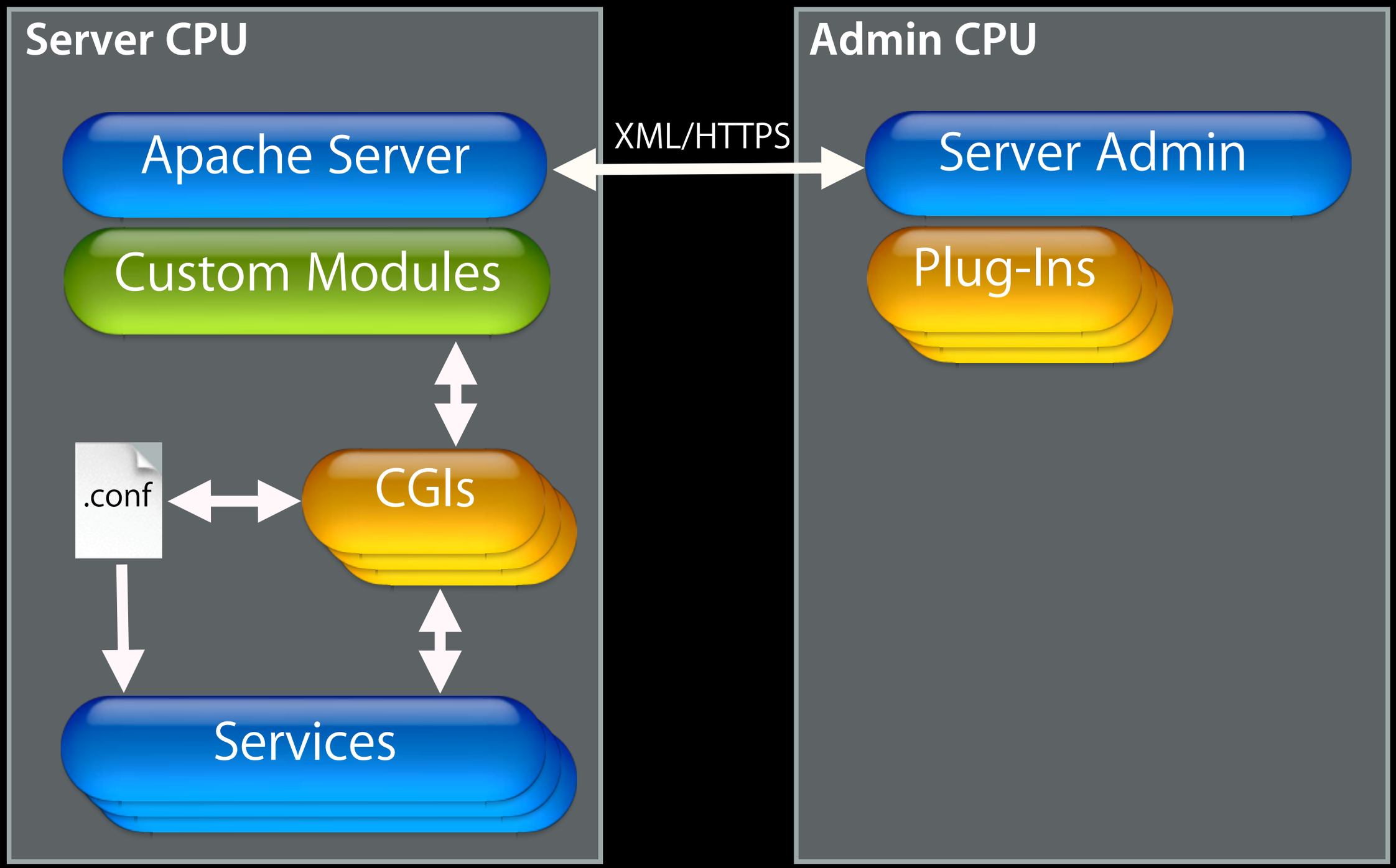
Server Admin Architecture



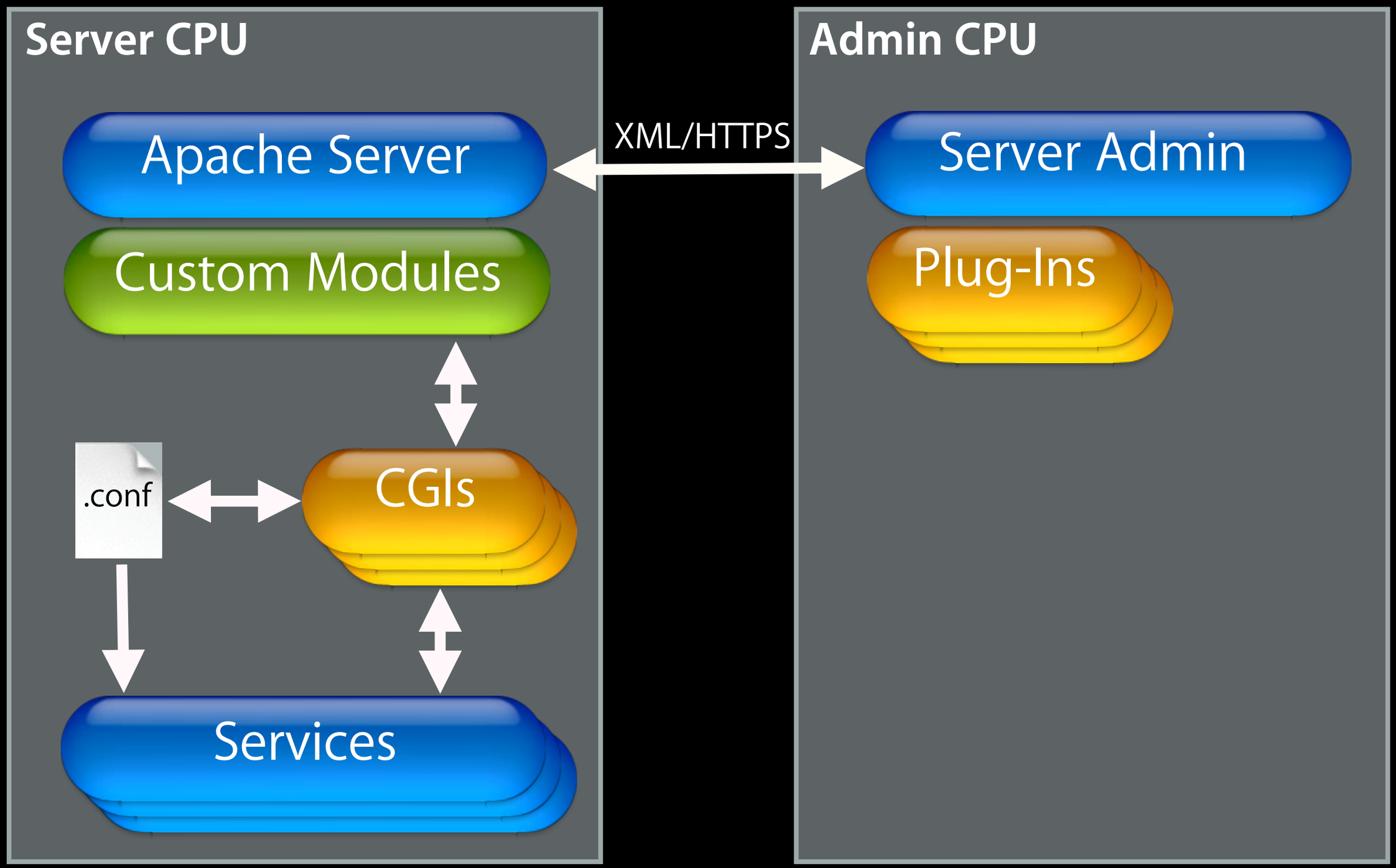
Server Admin Architecture



Server Admin Architecture

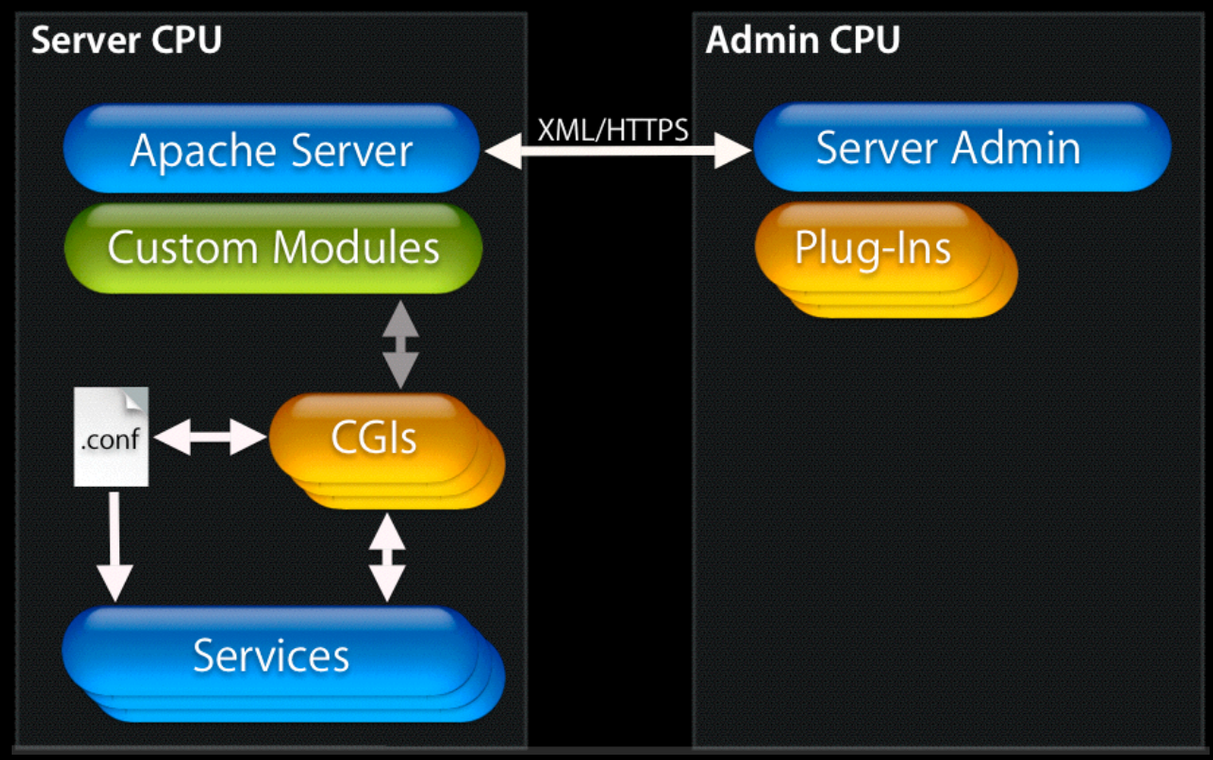


Server Admin Architecture



Server Admin Architecture and API

- Standards-based
- Easy to develop and debug - modular design
- Currently not public
- Let us know if you are interested in plugging in your administration software

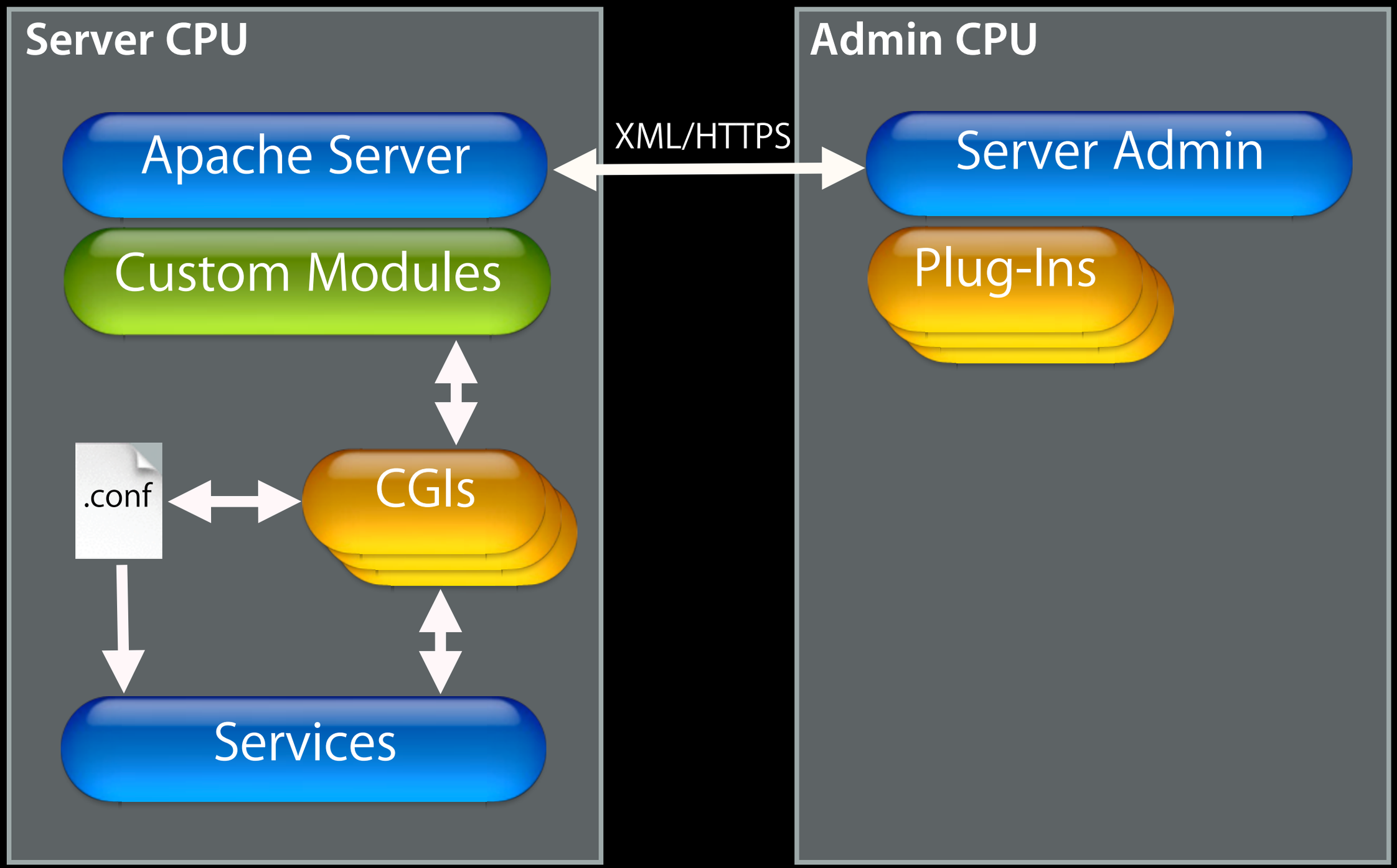


Demo

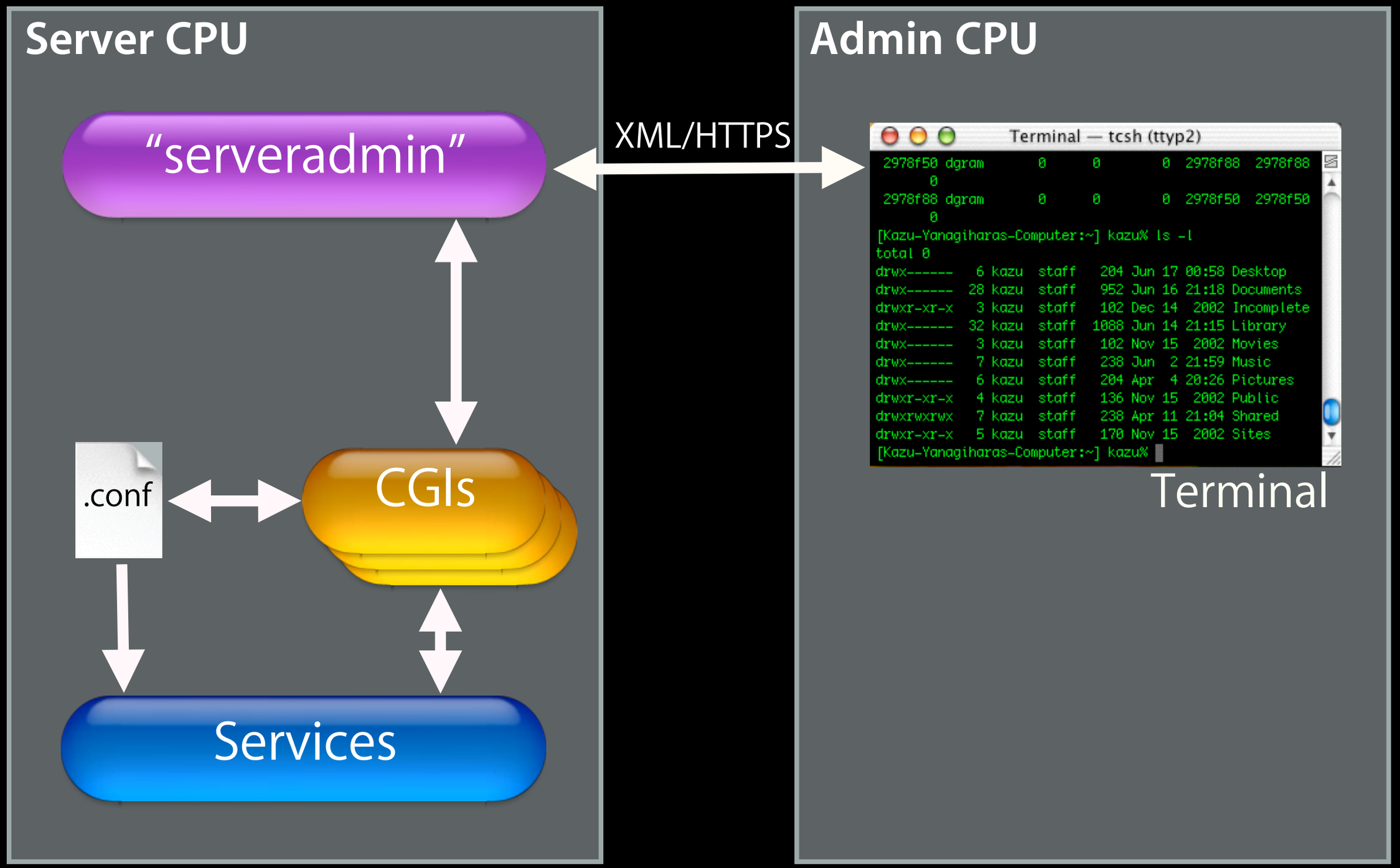
Server Admin Plug-in

Steve Olson
Sybase

Server Admin Architecture



Server Admin Architecture



Demo

“serveradmin” Command Line Tool

http://developer.apple.com/wwdc2003/urls.html

Server Administration Summary

- For system administrators
  - New Server Admin application with more features
  - New “serveradmin” command line tool
- For developers
  - Server Admin architecture available for their products
  - Contact Apple if interested

Server Assistant

Scott Mulligan
Mac OS X Server Engineering

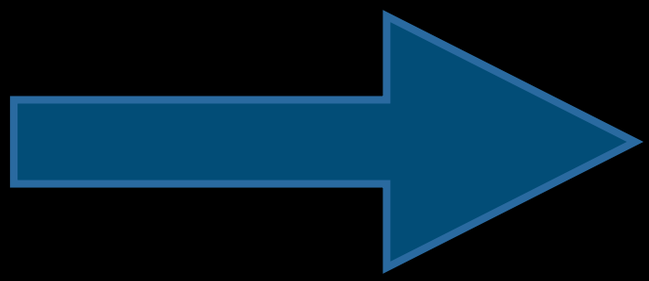
Jaguar Server Supported:

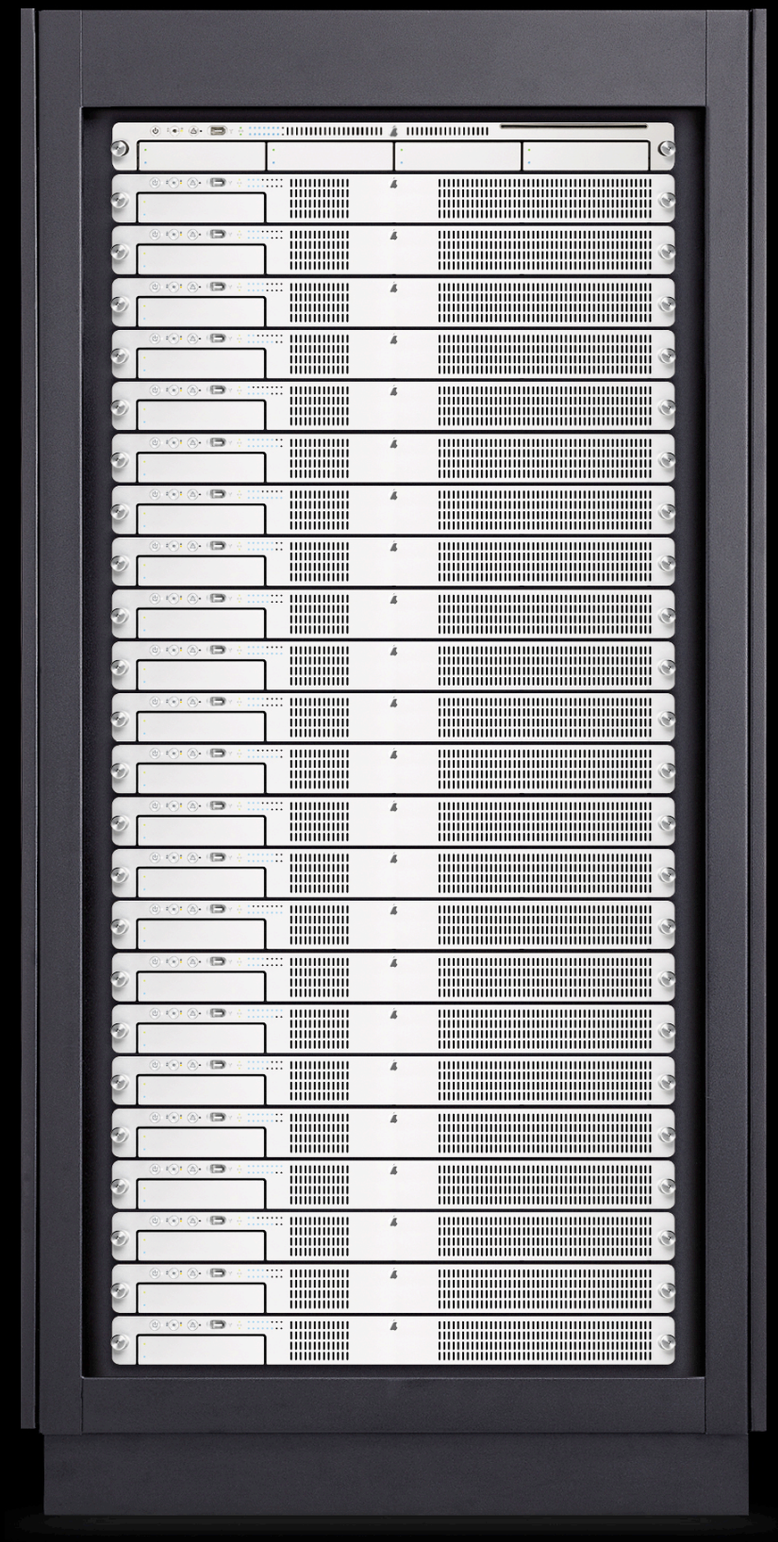
- Remote installs
- Local and remote setup

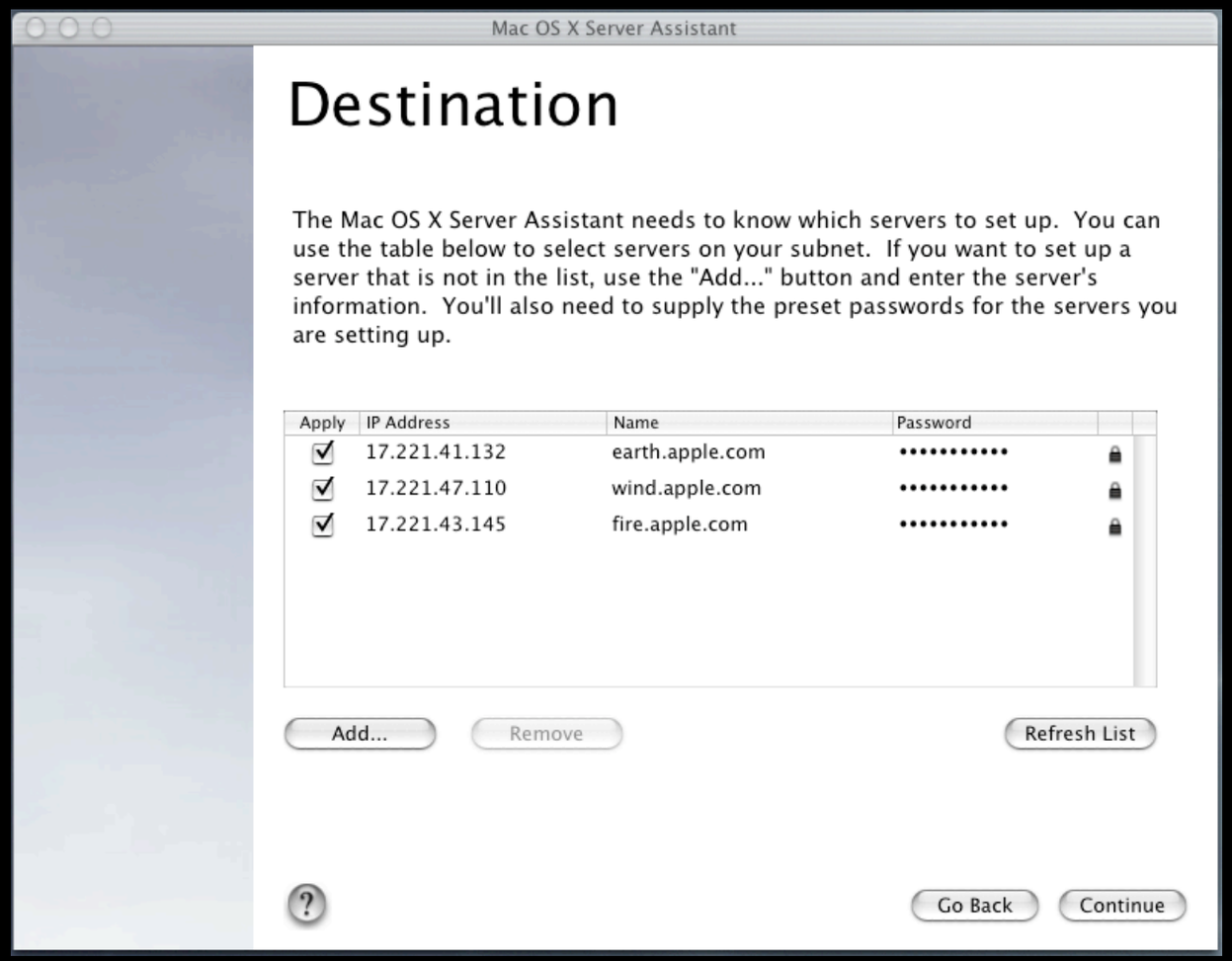
Panther Server Supports:

- Remote installs
- Local and remote setup
- Targeting remote servers for simultaneous setup

Targeting Multiple Remote Servers







Panther Server Supports:

- Remote installs
- Local and remote setup
- Targeting remote servers for simultaneous setup
- Auto-setup using pre-saved data

Panther Server Supports:

- Remote installs
- Local and remote setup
- Targeting remote servers for simultaneous setup
- Auto-setup using pre-saved data
  - Servers can discover setup data:

Panther Server Supports:

- Remote installs
- Local and remote setup
- Targeting remote servers for simultaneous setup
- Auto-setup using pre-saved data
  - Servers can discover setup data:
  - Stored on local file systems

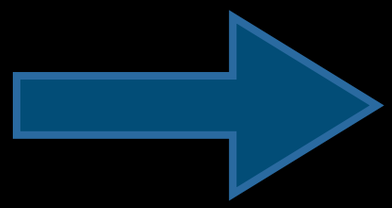
Panther Server Supports:

- Remote installs
- Local and remote setup
- Targeting remote servers for simultaneous setup
- Auto-setup using pre-saved data
  - Servers can discover setup data:
  - Stored on local file systems
    - Hard drives
    - CDs
    - FireWire drives
    - USB drives

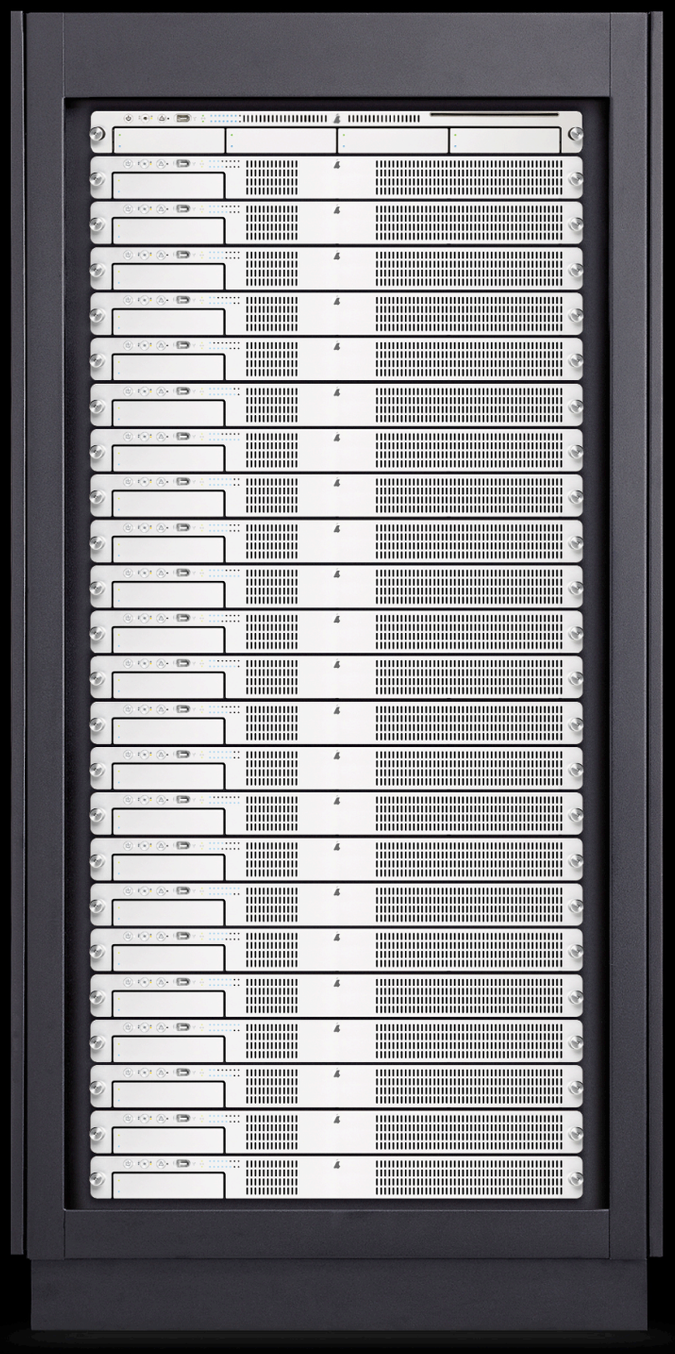
Panther Server Supports:

- Remote installs
- Local and remote setup
- Targeting remote servers for simultaneous setup
- Auto-setup using pre-saved data
  - Servers can discover setup data:
    - Stored on local file systems
      - Hard drives
      - CDs
      - FireWire drives
      - USB drives
    - Stored on a Directory Server

Your iPod Can Set Up Your Server!

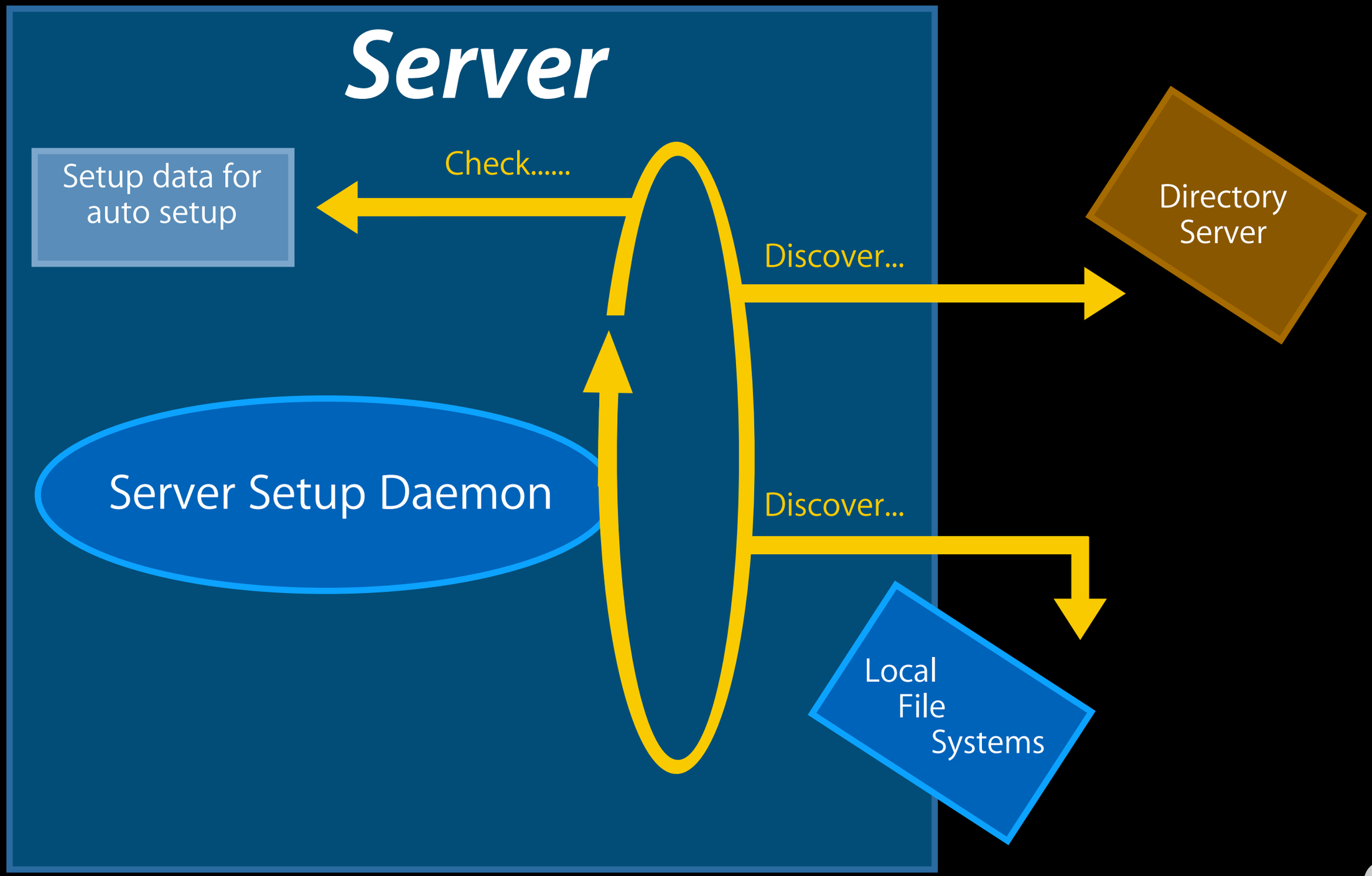


Your Servers Can Set Themselves Up!

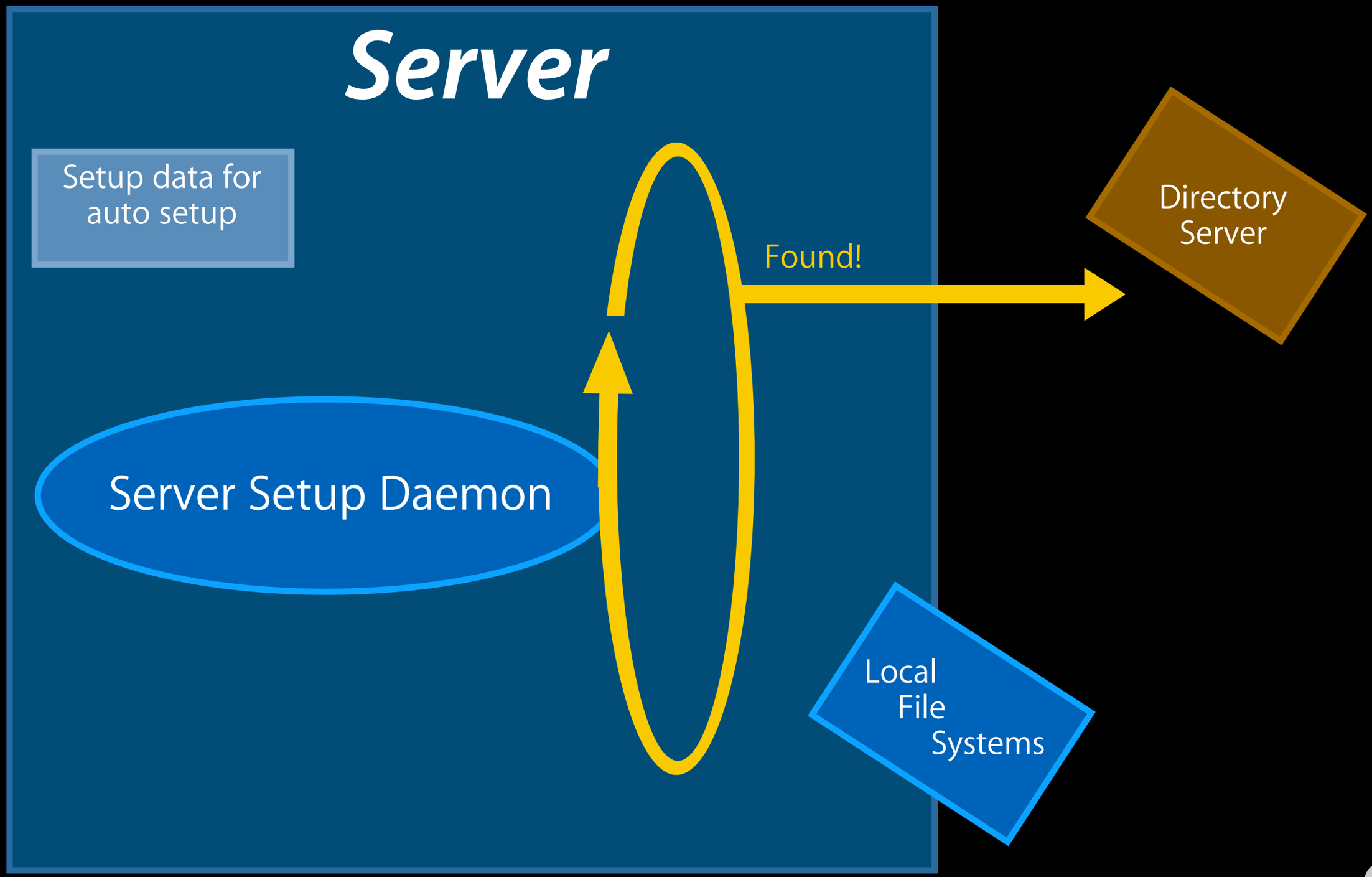


From a Directory Server
on your Network!

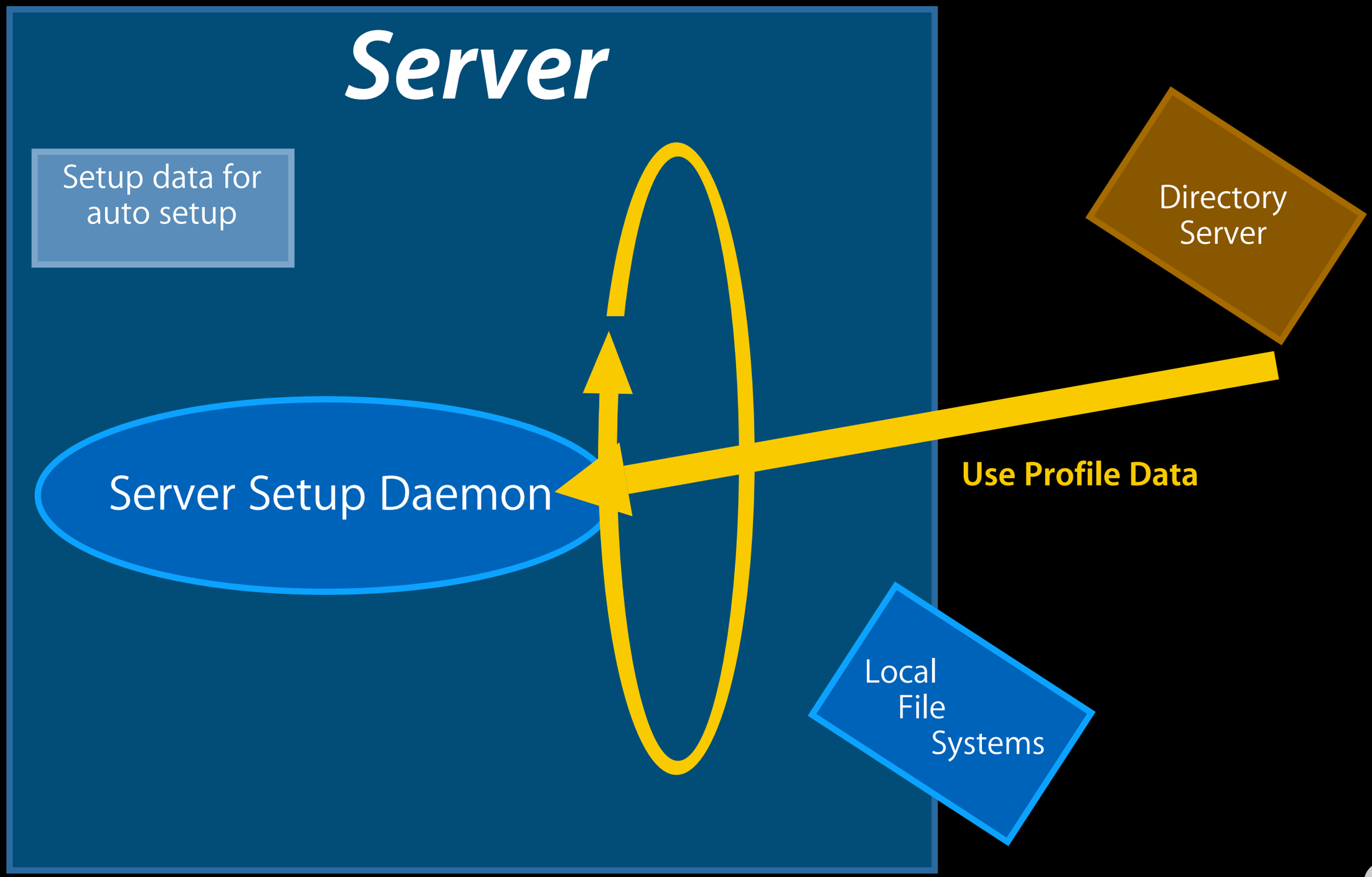
The Basic Design



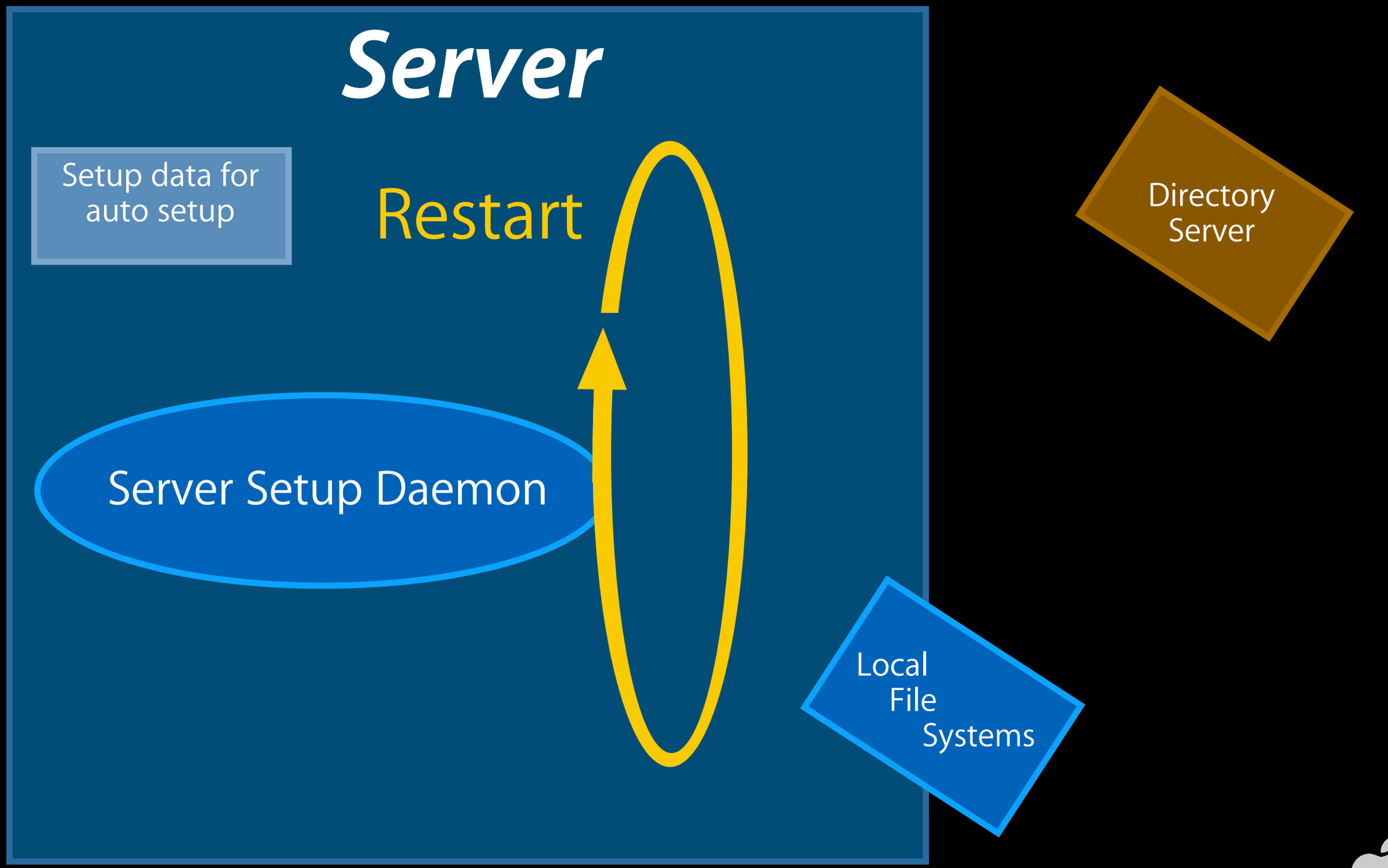
The Basic Design



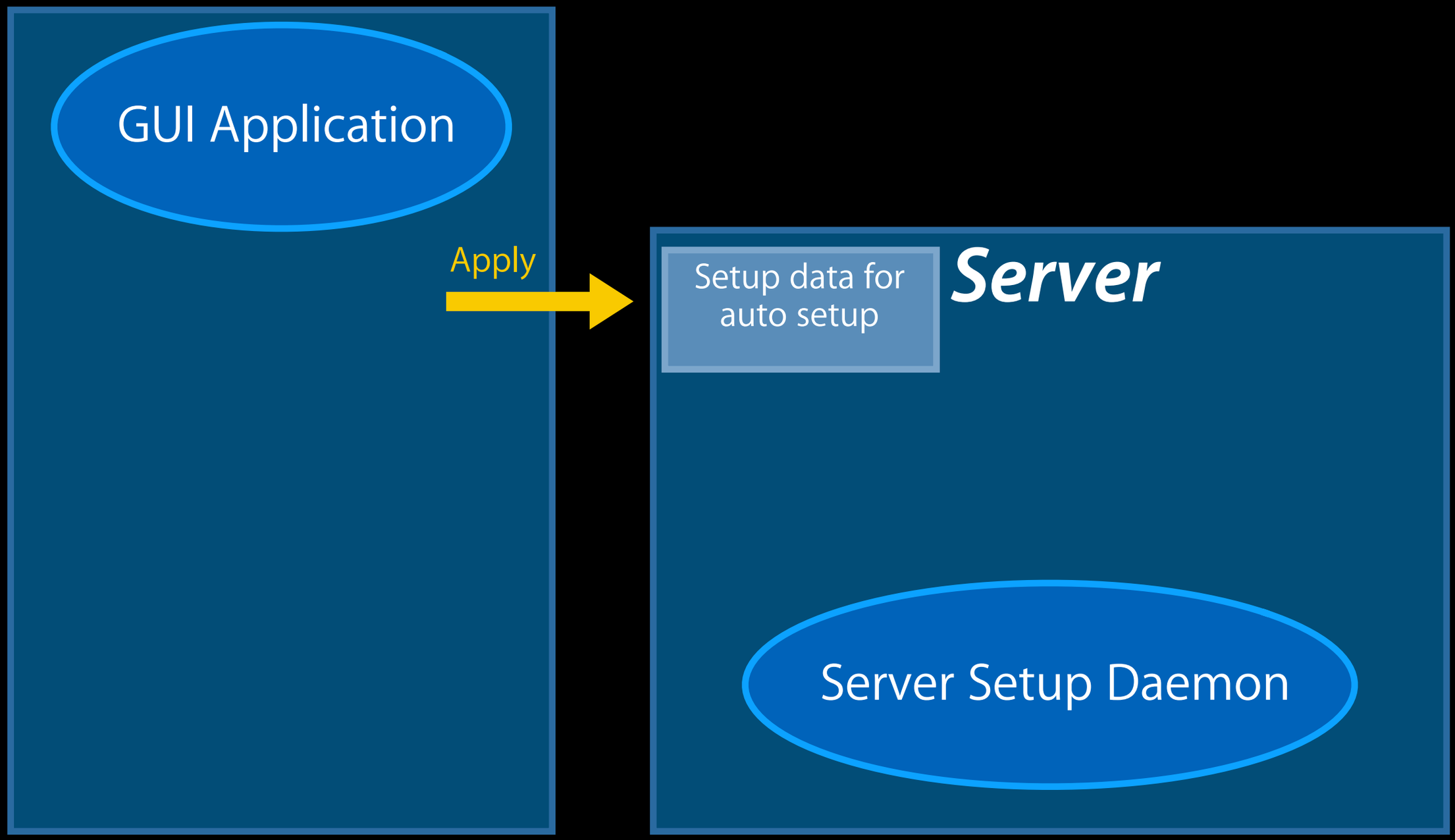
The Basic Design



The Basic Design



A Bigger Picture



A Bigger Picture

GUI Application

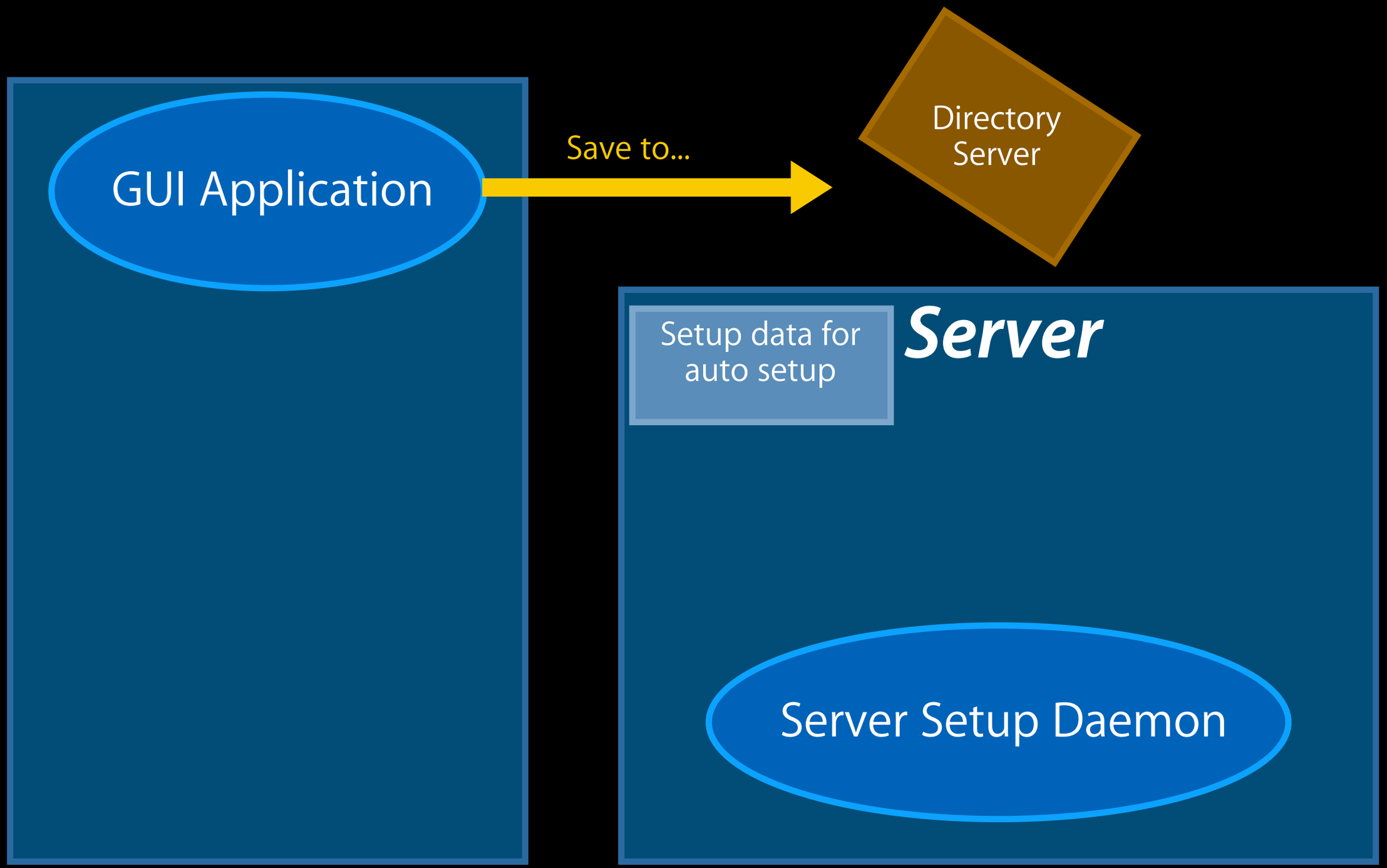
Setup data for auto setup

Server

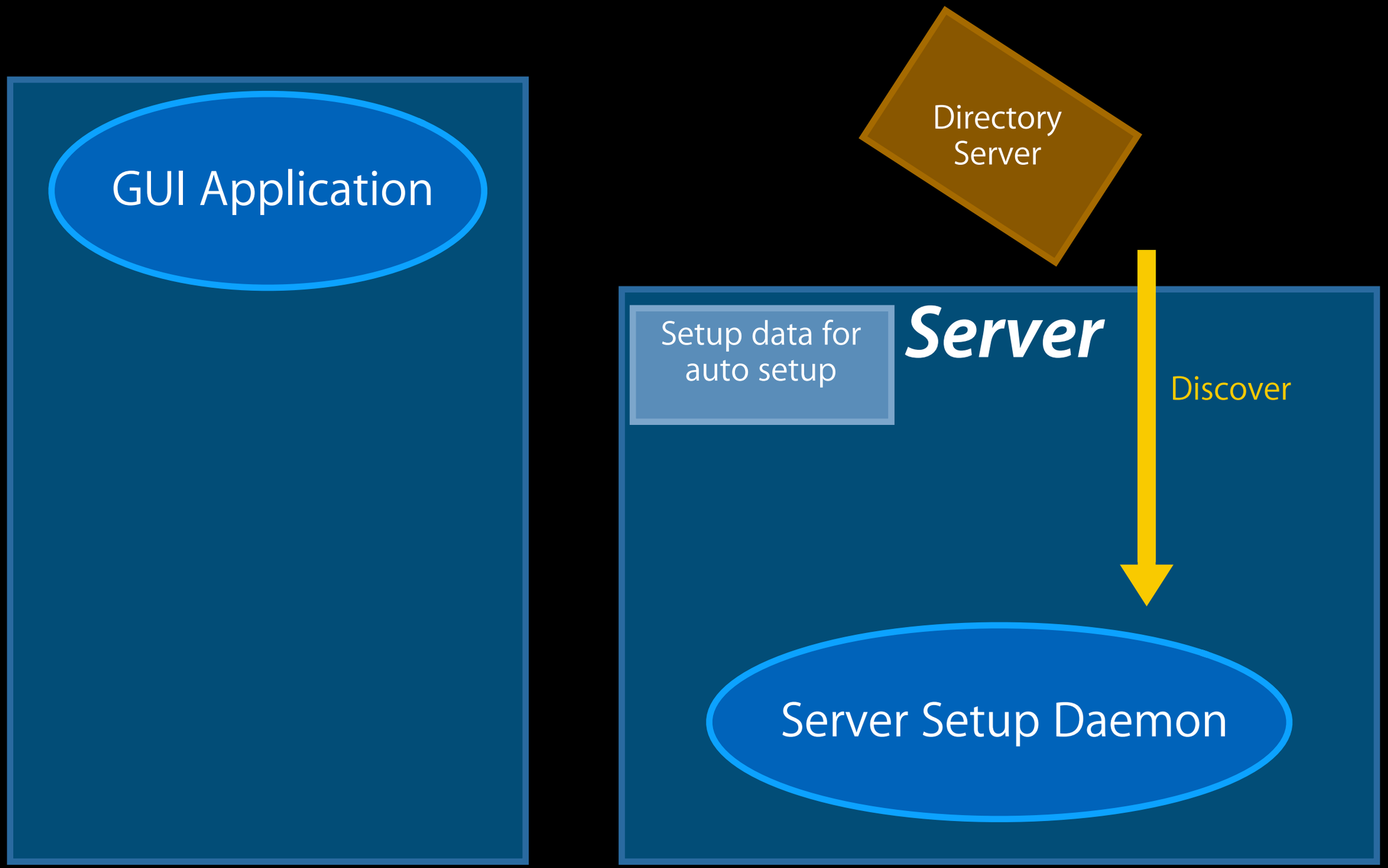
User Setup Data

Server Setup Daemon

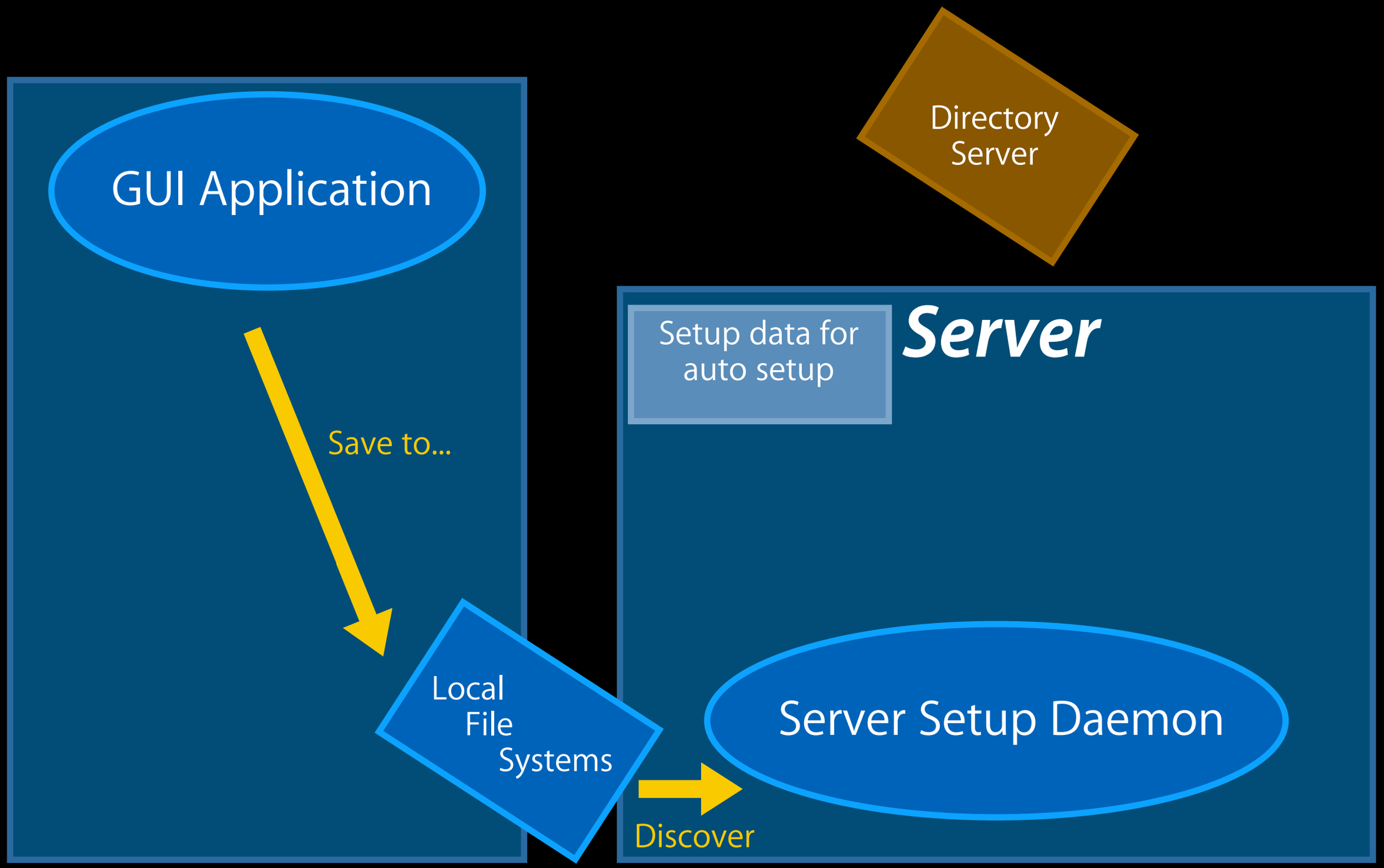
A Bigger Picture



A Bigger Picture



A Bigger Picture



Safeguarding Your Setup Data

- Saved setup data may be encrypted
- Uses the cast5-cbc algorithm of openssl(1)
- The server setup daemon process will:
  - Wait for decrypted data
  - Will look for a decryption key

Mapping Setup Data to System

- Saved setup data may be named based on:
- Ethernet address—003065c9f7c0.plist
- IP address—17.221.40.102.plist
- Hostname—freebie.apple.com.plist
- Hardware serial number—RM123005.plist
- generic.plist—this name will match any system

Demo

Server Assistant Auto-Configuration

Windows Compatibility

Rusty Tucker
Mac OS X Server Engineering

Windows Compatibility

Where we are today

- Stand Alone Server
  - Samba 2.2x
  - SMB file and print services
  - Functional limitations

Windows Compatibility

Panther Server "Fit In"

- Fit in to Active Directory networks
  - Proxied authentication
  - UID/GID Mapping
- See Directory Services Session 610 for additional details

Windows Compatibility

Replace Windows Servers

- Primary Domain Controller
  - Provide PDC directory and authentication services
    - Support Windows Domain Single Sign-on

Windows Compatibility

Replace Windows Servers

- Primary Domain Controller
  - Provide PDC directory and authentication services
    - Support Windows Domain Single Sign-on
  - Host Windows home directories and Roaming Profiles

Windows Compatibility

Replace Windows Servers

- Primary Domain Controller
  - Provide PDC directory and authentication services
    - Support Windows Domain Single Sign-on
  - Host Windows home directories and Roaming Profiles
  - Unified Management using Panther Admin tools

Windows Compatibility

Windows Network Login

- “Roaming Profiles”
  - Windows downloads settings from network
  - Similar to ~/Library on Mac OS X

Windows Compatibility

Windows Network Login

- “Roaming Profiles”
  - Windows downloads settings from network
  - Similar to ~/Library on Mac OS X
- Home Directory Mount (H:)
  - Contains shared items
  - Similar to ~/Public on Mac OS X

Windows Compatibility

Windows Network Login

- "Roaming Profiles"
  - Windows downloads settings from network
  - Similar to ~/Library on Mac OS X
- Home Directory Mount (H:)
  - Contains shared items
  - Similar to ~/Public on Mac OS X
- Start Up script

Windows Compatibility

Samba 3

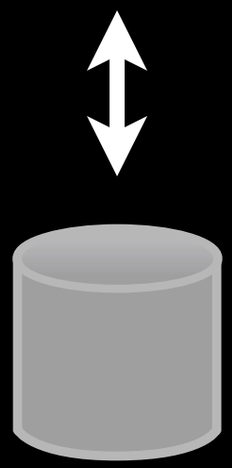
- Unicode support for wire protocol
- Plugin support for user accounts
- Plugin support for authentication
- “Just in Time” Home Directory creation

Windows Compatibility

Samba 3 Integration

Windows Compatibility

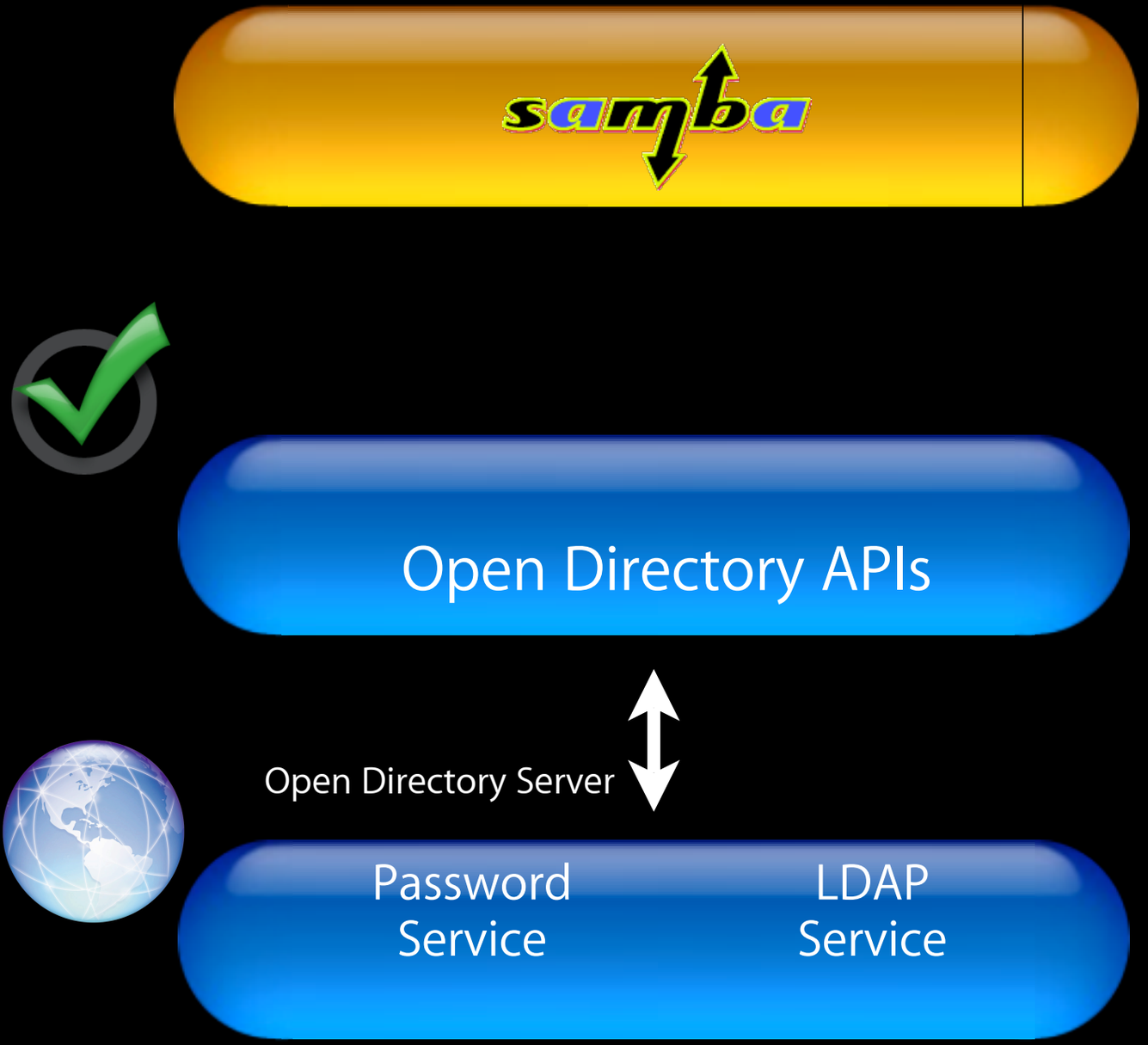
Samba 3 Integration



Primary Directory source is private databases

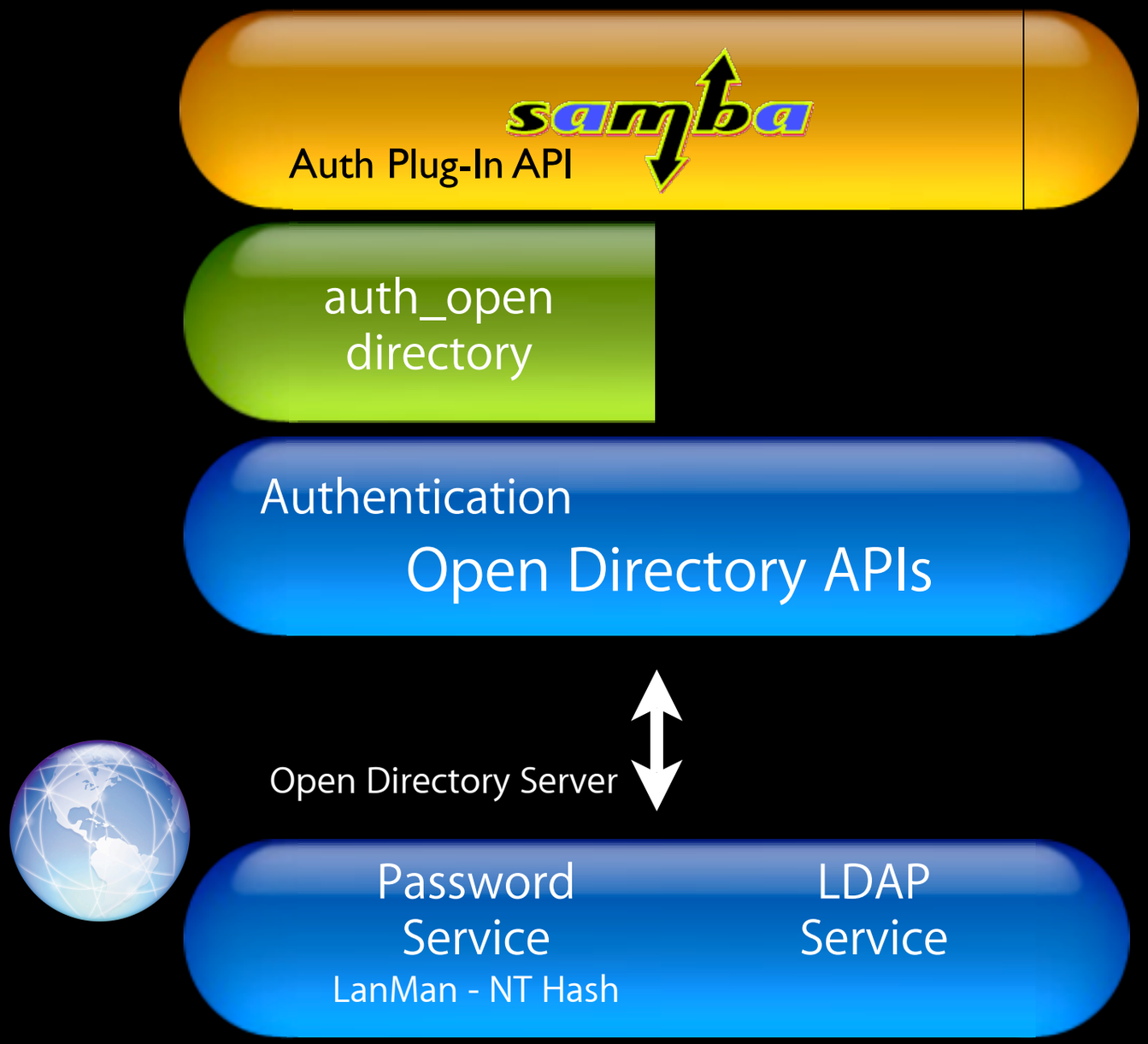
Windows Compatibility

Samba 3 Integration



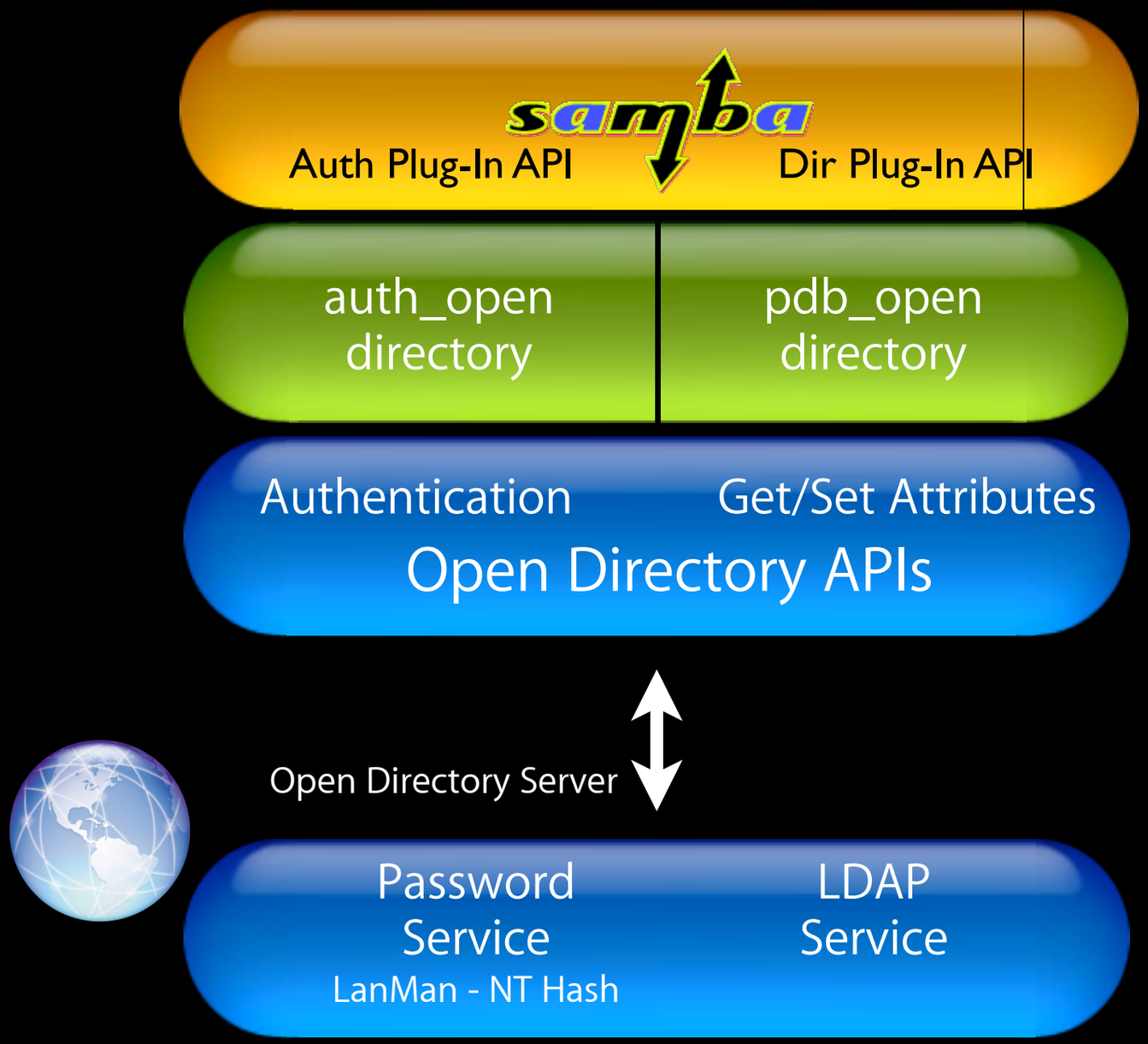
Windows Compatibility

Samba 3 Integration



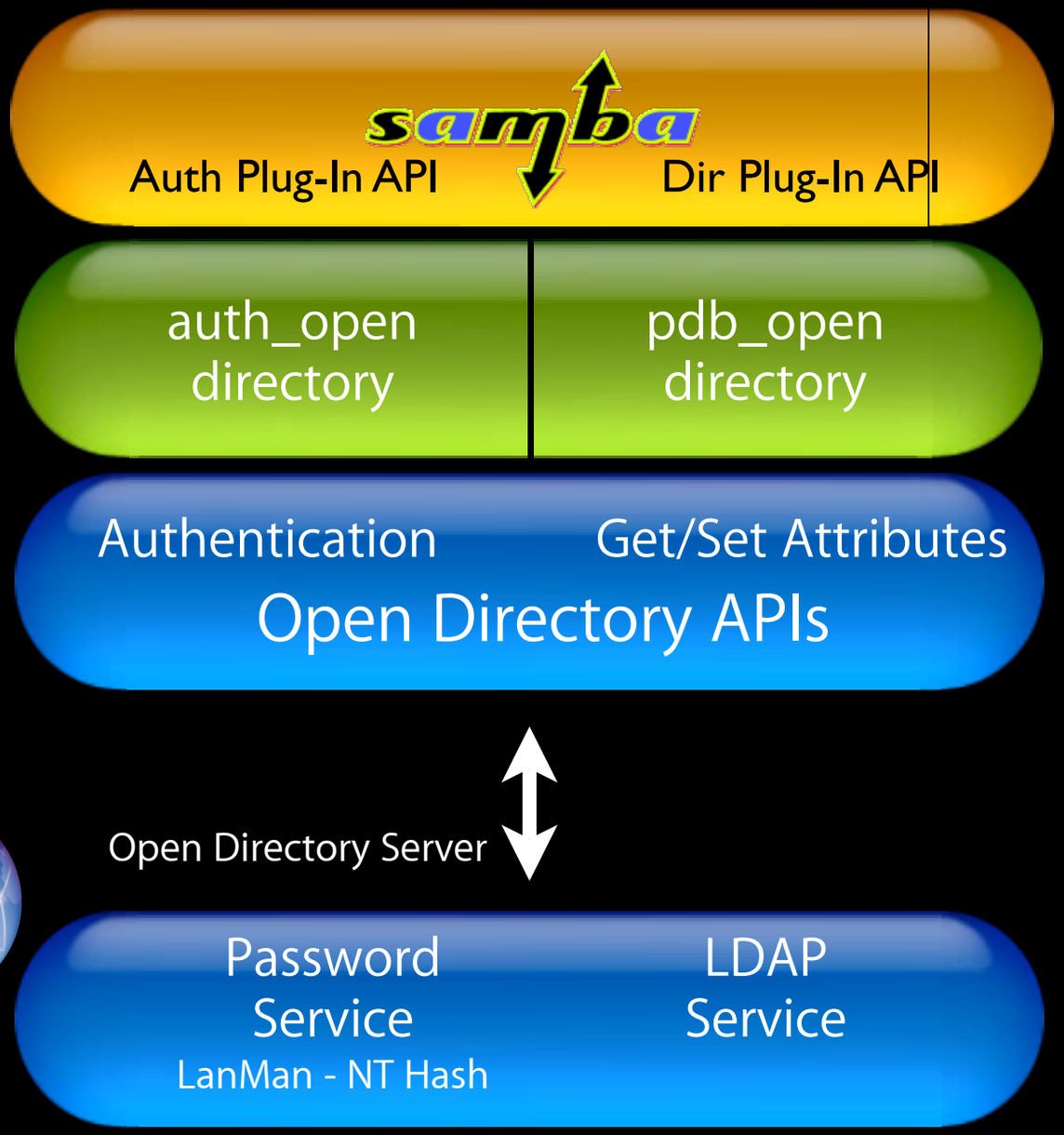
Windows Compatibility

Samba 3 Integration



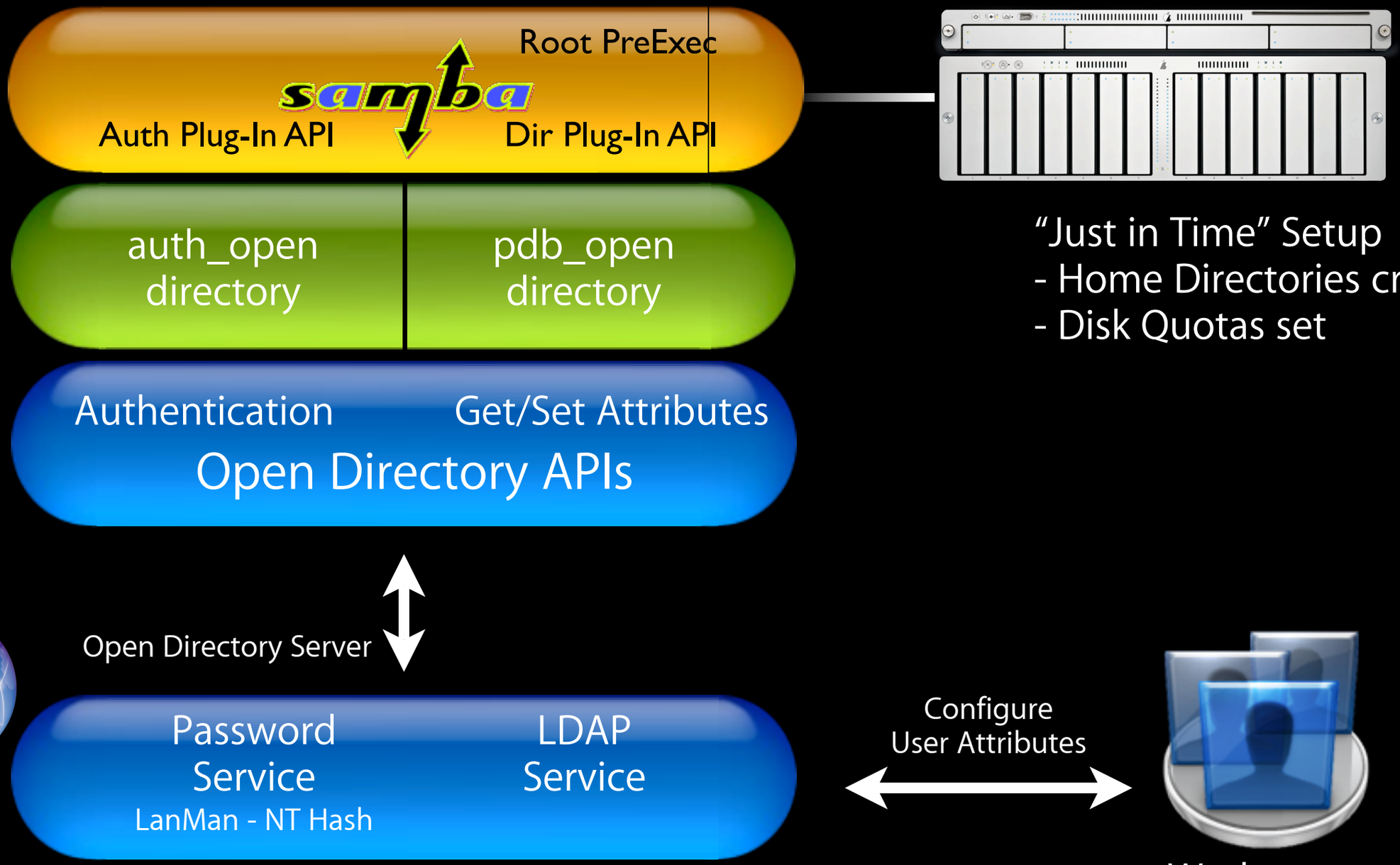
Windows Compatibility

Samba 3 Integration



Windows Compatibility

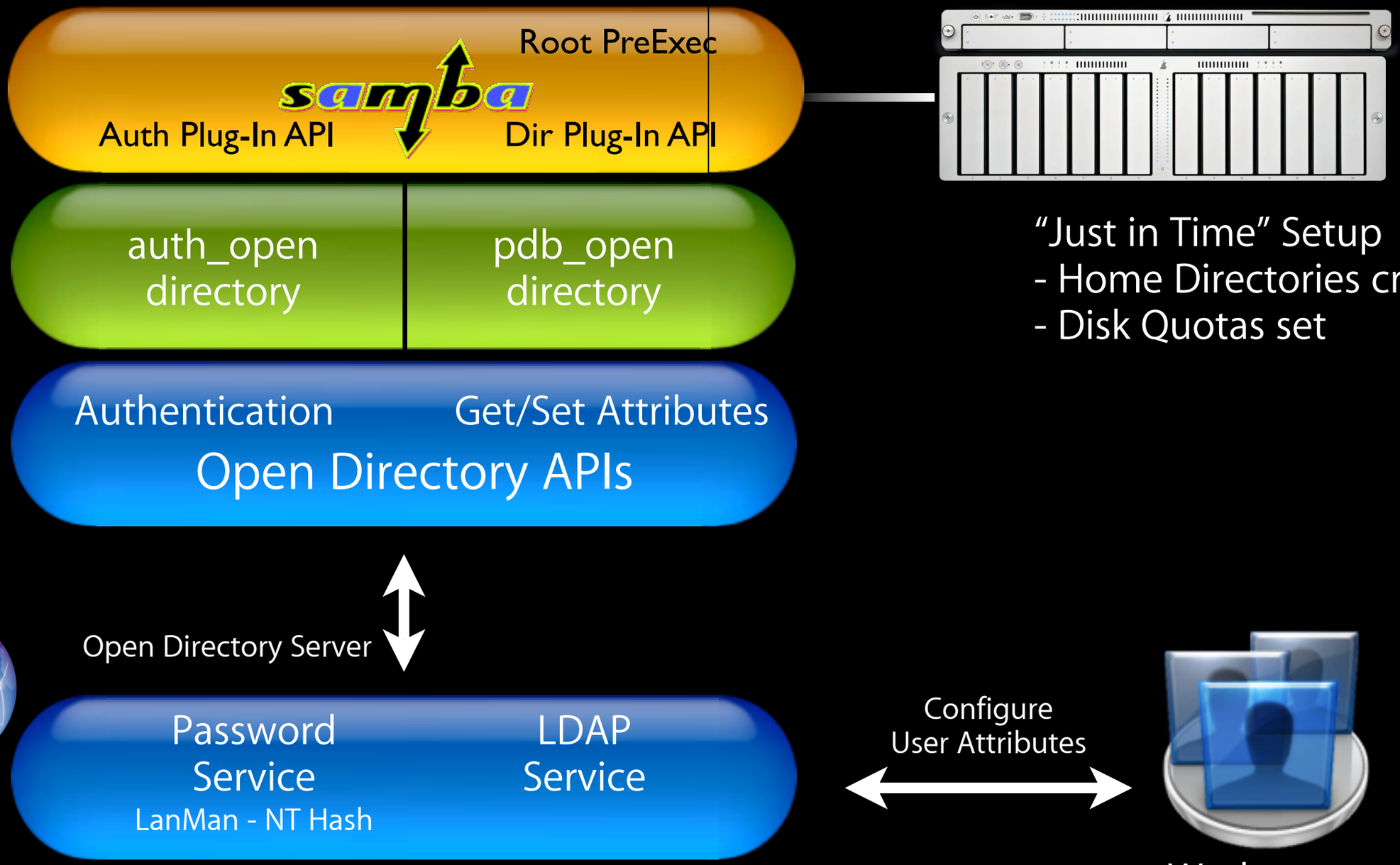
Samba 3 Integration



"Just in Time" Setup
- Home Directories created
- Disk Quotas set

Windows Compatibility

Samba 3 Integration



"Just in Time" Setup
- Home Directories created
- Disk Quotas set

Windows Compatibility

Samba 3 Integration

- Source code is available on Darwin site
  - <http://developer.apple.com/darwin/>

Windows Compatibility

Open Directory native attributes in Mac OS X

User records

- `kDS1AttrSMBHomeDrive`
  - Drive letter for homedirectory mount point
- `kDS1AttrSMBHome`
  - UNC address of Windows homedirectory share
- `kDS1AttrSMBScriptPath`
  - Login script path
- `kDS1AttrSMBProfilePath`
  - Roaming Profile path (dock, desktop links, etc.)

Windows Compatibility

Open Directory native attributes in Mac OS X Computer records for Windows support

- kDS1AttrSMBAcctFlags
  - ‘W’ for windows computer records and reserved data
- kDS1AttrSMBGroupRID
  - Relative Group ID for the computer
- kDSNAttrAuthenticationAuthority
  - Pointer to Password Server or “Basic”

Demo

Windows Compatibility

Developing for Mac OS X Server

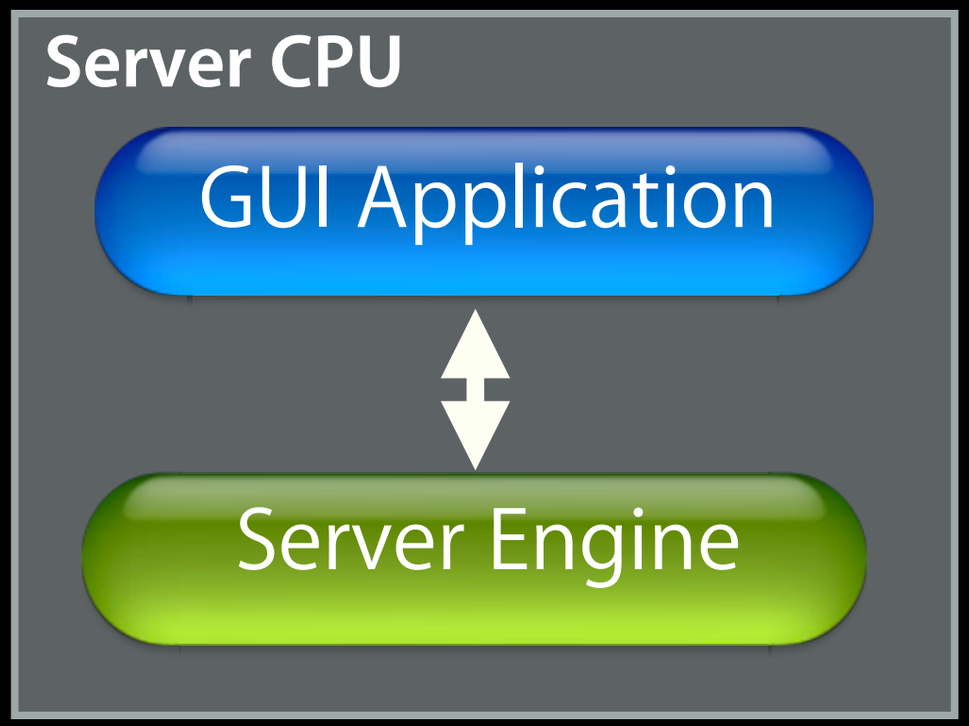
Greg Vaughan
Mac OS X Server Engineering

Keep Xserve in Mind

- Make sure that server can run headless
  - No keyboard or monitor
  - No login session
- Beware of frameworks you use
  - Avoid: AppKit, Carbon (except CarbonCore), any API that might bring up a dialog
  - Safe APIs: CoreServices, Foundation, CoreFoundation, other low level APIs

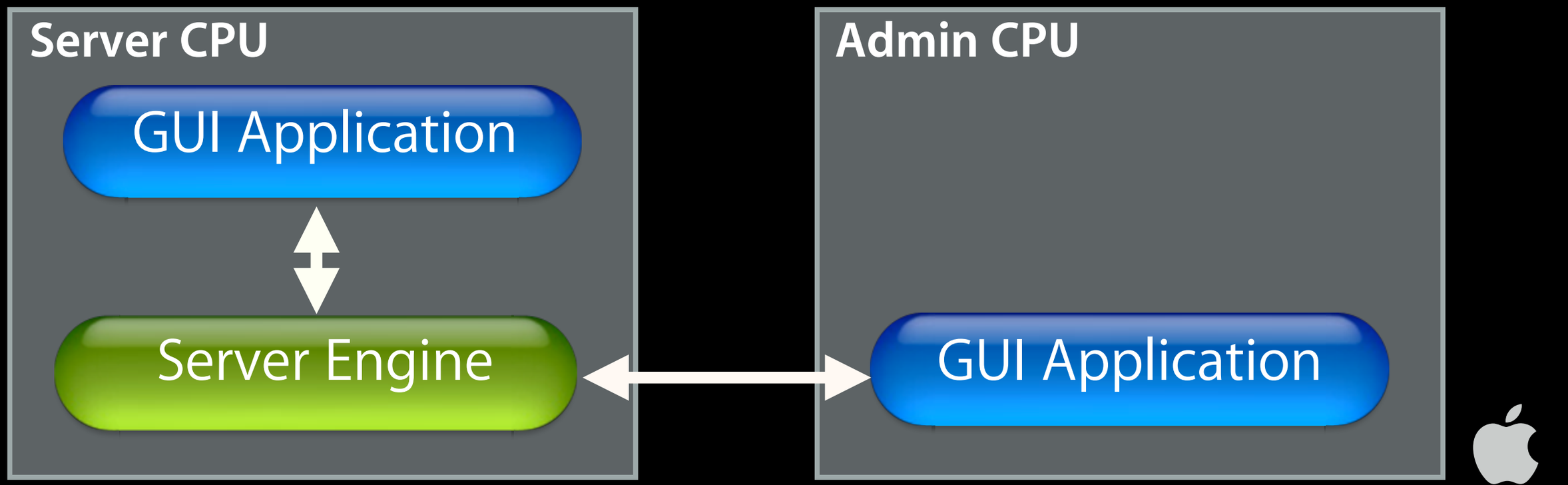
Keep Xserve in Mind

- Separate server engine from GUI portion



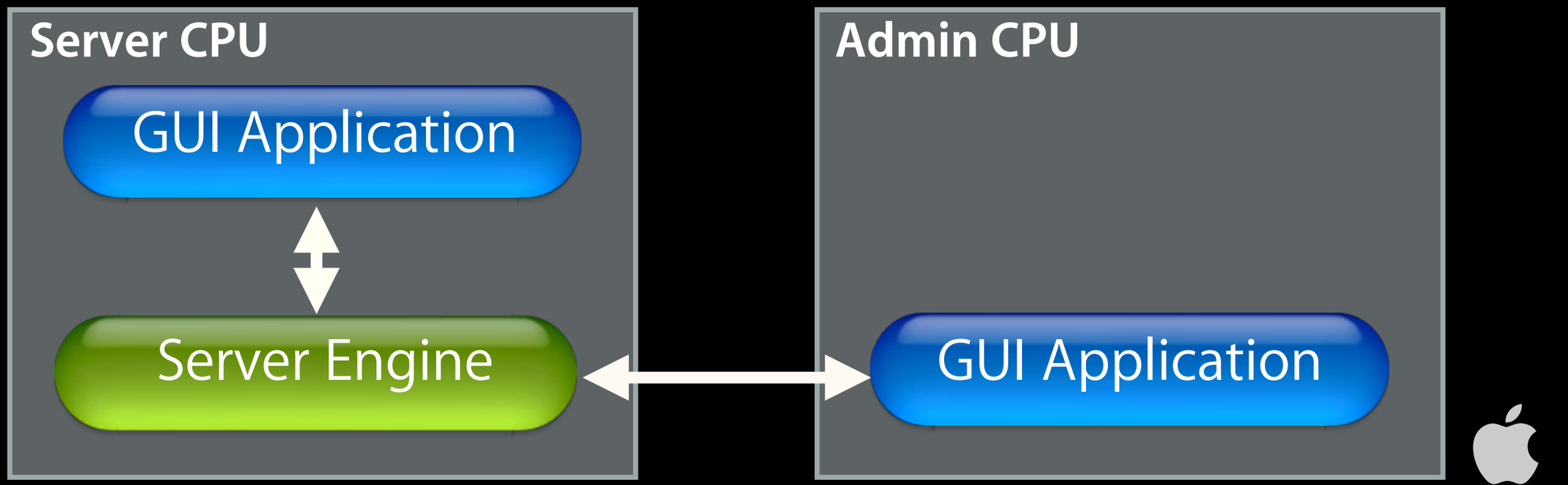
Keep Xserve in Mind

- Separate server engine from GUI portion
- GUI must be able to run locally or remotely
  - Provide a way to browse and target server



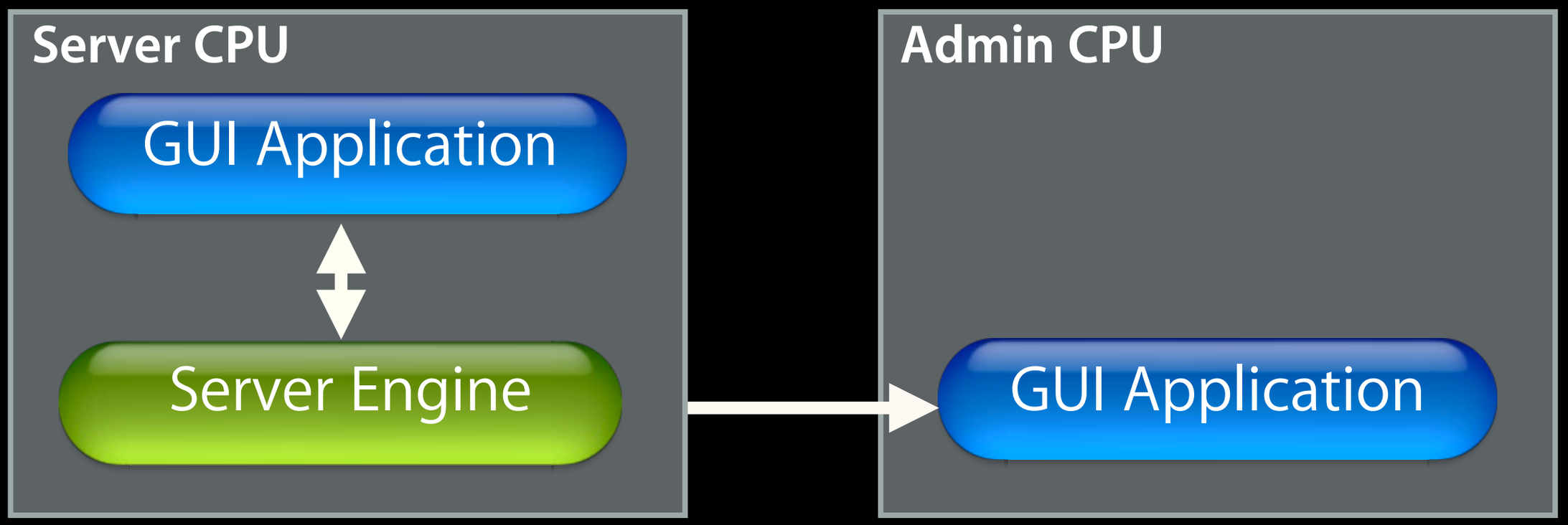
Keep Xserve in Mind

- Separate server engine from GUI portion
- GUI must be able to run locally or remotely
  - Provide a way to browse and target server
- Provide network connection
  - HTTP, Open Directory, SSH



Keep Xserve in Mind

- Separate server engine from GUI portion
- GUI must be able to run locally or remotely
  - Provide a way to browse and target server
- Provide network connection
  - HTTP, Open Directory, SSH
- Package them in separate installers



Optimizing Performance

- Reduce system calls
  - Our changes to Samba 3 (pread/pwrite, spinlocks)
- recv/send instead of read/write
  - msgwaitall on recv
- Memory mapped I/O
- Look at impact on system resources

Scalability

- Look to the future
- Large hard drives
- Large directory systems
  - Avoid enumerating users
  - Do directed searches instead
- Lots of connected users
- Allow for a variety of connection speeds
  - Look at number of network transactions
  - Avoid tying up resources during slow transfers

Available APIs

- Open Directory
  - Use DS API instead of platform specific calls
  - Opportunity to develop plug-ins
- Kerberos
  - All authenticated services should support it
- Mail
  - Filter API for SPAM and virus filtering products
- QuickTime Streaming Server

For More Information

Who to Contact

Skip Levens
Server Technology Evangelist
slevens@apple.com

Eric Zelenka
Mac OS X Server Marketing
ericz@apple.com

http://developer.apple.com/wwdc2003/urls.html

Roadmap

607 Authentication in Mac OS X Server	Nob Hill Tue, 5:00pm
FF002 Mac OS X Server Feedback	North Beach Tue, 5:00pm
610 Directory Services	The Mission Wed, 10:30am
108 Kerberos in Mac OS X	The Mission Thu, 9:00am
621 Deploying Xserve	Russian Hill Thu, 3:30pm
727 QuickTime Streaming Server Programming	The Mission Thu, 2:00pm

Reference Library

Source Code

Open Directory
http://developer.apple.com/darwin/projects/opendirectory/

Darwin Streaming Server
http://developer.apple.com/darwin/projects/streaming/

Samba and Plug-ins
http://developer.apple.com/darwin/projects/darwin/

Reference Library

Feedback

Server Feedback Web Page
http://www.apple.com/feedback/server.html

Q&A

http://developer.apple.com/wwdc2003/urls.html

WWDC 2003

Worldwide Developers Conference